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CONTENTS

No. 1, July, 1948

A Treatise on the North American Ranunculi ..... Lyman Benson 1
Book Reviews 262

No. 2, September, 1948

A Study of Mosquito Behavior. An Experimental Laboratory Study of the Sexual Behavior of Aedes aegypti (Linnaeus) ..... Louis M. Roth 265
The Food of the Bridled Shiner, Notropis bifrenatus (Cope) ..... Robert W. Harrington, Jr. 353
Notes on the Amphibians of Venango County, Pennsylvania ..... Paul L. Swanson 362
American Caudata. III. The Status of Pseudotriton montanus in Ohio ..... M. B. Mittleman and H. T. Gier 372
Notes on a Herpetological Collection from the Middle Mississippi Valley ..... Sherman A. Minton, Jr. and John E. Minton 378
Birds in an Oak Forest during a Gypsy Moth Outbreak in South-Slovakia ..... Frank J. Turcek 391
Population Density, Life Span, and Mortality Rates of Small Mammals in the Blue-Grass Meadow and Blue-Grass Field Associations of Southern Michigan ..... W. Frank Blair 395
Variation in the Deer-Mouse (Peromyscus maniculatus) Along the Lower Columbia River ..... Wade Fox 420
Notes on the Mating of Some Zonitoides (Ventridens) Species of Land Snails ..... Glenn R. Webb 453
Observations on Cestodes in North American Owls with the Description of Choanotaenia speotytonis n. sp. (Cestoda: Dipylidiinae) ..... Robert Rausch 462
The Box Turtle as a Host for Dipterous Parasites ..... James A. Peters 472
A List of Vascular Plants from St. Louis County, Minnesota ..... George Neville Jones 475
Studies in the Comparative Anatomy of the Ericales II. Ericaceae—Subfamily Arbutoideae ..... Hiden T. Cox 493
Book Reviews 517

No. 3, November, 1948

Faunistic and Ecological Studies on the Orthoptera of the Big Bend Region of Trans-Pecos Texas, with Especial Reference to the Orthopteran Zones and Faunae of Midwestern North America ..... Ernest R. Tinkham 521
The Larvae of the Fungus-Growing Ants ..... George C. Wheeler 664
Life History of Elliptio complanatus (Dillwyn, 1817) ..... Max R. Matteson 690
Principal Institutional Herbaria of the United States ..... George Neville Jones and Edna Meadows 724
The Vegetation of Sodon Lake ..... Stanley A. Cain and John V. Slater 741
Dryopteris Hybrids ..... Albert Chandler 763
Book Reviews 774

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The

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Founded by J. A. Nieuwland, C.S.C.

John D. Mizelle, Editor

A Treatise on the North American Ranunculi

Lyman Benson

Vol. 40 July, 1948 No. 1

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A Treatise on the North American Ranunculi

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CONTENTS

Introduction 1
Methods of investigation 3
Field studies 3
Herbarium studies 5
Diagnostic characters 7
The nectary scale 7
Vegetative parts 8
Reproductive parts 9
Geographical distribution 10
The natural vegetation areas of North America 11
Boreal flora 11
Pacific Northwestern flora 13
Sierra Madrean flora 13
Plains flora 15
Prairie flora 15
Eastern and Middle Western flora 15
Atlantic Coastal Plain relict flora 15
Mexican Desert flora 15
Subtropical flora 16
Coastal flora 16
Policy in classification 17
Concept of genera 17
Concepts of species and varieties 17
Acknowledgments 21
References 22
Ranunculus L. 23
List of species and varieties by subgenera and sections 252
Index 255

Introduction

The most important landmark in the study of *Ranunculus* in North America is Asa Gray's thorough and consistent *Revision of the North American Ranunculi* (Gray, 1886).

It is remarkable that in the "eighties" Gray was able to analyze many of the populations of *Ranunculus*, particularly those of some of the western species, with a considerable degree of accuracy. At that time the scarcely known Alaskan Peninsula was still spoken of with contempt as "Seward's Icebox", British Columbia and Alberta were almost untraversed, and the three organized Western States* and the adjacent territories were largely unexplored. Colleges and universities were just beginning to appear in the Far West, and

* California was admitted to the Union in 1850, Oregon in 1859, and Colorado in 1876.

resident collectors were few. Gray's specimens from the Rocky Mountains and westward were collected by botanists and physicians accompanying surveying and exploring parties. Plants from even the eastern United States and Canada were known only from scattering localities in proximity to the few institutions engaged in taxonomic research and to the homes of private collectors.

Since 1886 and particularly since the advent of the automobile and of good roads penetrating even the remote mountain regions, the accumulation of herbarium specimens has been of such magnitude that complex new questions of plant relationships have come to light and the data necessary for solution of many old problems have become available. The activity of collectors has resulted in the proposal of numerous specific and varietal epithets, and many of these have not been evaluated at all, or at least they have not been investigated in accordance with new concepts of species definition. Many species have accumulated three or four or even a dozen epithets used in many combinations, and in some instances the same name has been applied to more than one plant. A few of the problems which have arisen since 1886 have been cleared up by Robinson's treatment of the genus published in Gray's *Synoptical Flora of North America* (1895), by Davis' study of the North American *Ranunculi* (1900), and by publications on local floras, but the North American species of buttercups have had no thorough or uniform study as a group since the death of Dr. Gray.

In the period from 1934 to 1944, the writer published a number of articles concerning the North American *Ranunculi,* and a complete, annotated list of them follows this paragraph. The more significant data and conclusions in most of these articles are incorporated into or superceded by this publication, which is a much fuller treatment of *Ranunculus* than any one of them. It should be noted, however, that major bodies of data presented in two of these papers have been excluded from this treatise in order to avoid duplication and that a rounded coverage of the genus must involve these publications as well as the present one. These are entitled *The North American Subdivisions of Ranunculus* and *The Relationship of Ranunculus to the North American Floras.*

1934—The *Ranunculus hydrocharoides* group in California. Madrono 2: 129-130. *R. hydrocharoides, R. Gormanii,* and *R. Populago.*

1936—Pacific States *Ranunculi* I & II. Amer. Jour. Bot. 23: 26-33, 169-176. A full treatment of the species occurring in Washington, Oregon, and California.

1939—Two new species of *Ranunculus* § *Flammula.* Amer. Jour. Bot. 26: 555-557. (With Annetta Carter.) *R. oresterus* (Oregon) and *R. alveolatus* (California).

1940a—Taxonomic Contributions. Amer. Jour. Bot. 27: 186-190. The following items: II. New combinations in *Ranunculus* for Arizona. III. A new collection of *Ranunculus oresterus* (Idaho).

1940b—The North American subdivisions of *Ranunculus.* Amer. Jour. Bot. 27: 799-807. Definition of the subgenera and sections; discussion of the significance in classification of the nectary scale. Keys and descriptions for the major groups.

1941-2—North American *Ranunculi*—I to V. Bull. Torrey Club 68: 157-172, 477-490, 640-659. 69: 298-316, 373-386. North America only north of Mexico; species descriptions and citation of specimens not included. Additional data have required revision of various species and varieties, since the material of several large herbaria has been examined since 1942.

1942a—The relationship of *Ranunculus* to the North American floras. Amer. Jour. Bot. 29: 491-500. Discussion of the significance of data from field work and from study

of *Ranunculus* in formation of a new floristic classification system for the vegetation of North America north of Mexico correlated with the geological history of various parts of the continent.

1942b—*Ranunculus* in T. H. Kearney and R. H. Peebles, The flowering plants and ferns of Arizona. U. S. Dept. Agric. Misc. Publ. (423): 326-331. U. S. Govt.

1944a—*Ranunculus* in L. R. Abrams, Illustrated Flora of the Pacific States 2: 197-215. Stanford University Press.

1944b—A reply to Dr. Polunin. Bull. Torrey Club 71: 254-257. A brief answer to the more significant criticisms in an article by Nicholas Polunin entitled "Supplementary notes on arctic and boreal species in Benson's 'North American Ranunculi'" appearing in the same publication.

1948a—*Ranunculus* in Ray J. Davis, Contributions Toward a Flora of Idaho (22): 11-31.

1948b—The identity of *Ranunculus uncinatus* D. Don. Amer. Midl. Nat. 39(3): 761.

In addition to the publications listed above, the following are in manuscript:

Ranunculus in The North American Flora, New York Botanical Garden.

Ranunculus in T. H. Kearney and R. H. Peebles, The flowering plants and ferns of Arizona. ed. 2.

Methods of Investigation

Field Studies

Gray's *Revision of the North American Ranunculi* is a scholarly and thorough presentation of the data available in 1886 but, despite its excellence and the greatness of Dr. Gray, it is lacking in one of the essentials of a flora or monograph, that is, first-hand study of the plants in the field. Insofar as American botany is concerned, appreciation of the significance of field studies was the contribution of Thomas Nuttall, David Douglas, and other pioneer botanists. However, in writing floras and monographs, Gray seems to have lost sight of the value of knowing plants in their native situation and of recognition of factors in classification not to be observed on a herbarium sheet. It remained for Greene and others who succeeded Gray to rediscover the growing plant and the existence of minor colonies or populations occurring in nature and not represented in the herbaria.

During the preparation of this revision, an attempt has been made to see as many as possible of the species of *Ranunculus* in the field and to determine for each species as much as might be observed of its ecological requirements, of the nature and distribution of its minor colonies or biotypes, and of the degree and types of character recombinations occurring where its distributional area overlaps the areas of related *Ranunculi*. In the course of collecting and classifying 12,900 plant specimens, 52 species and varieties of *Ranunculus* have been studied and pressed in the field, and approximately 600 collections of the genus have been made in thirty-six states and Canadian provinces and the northern edge of Mexico, but particularly in the eleven Western States and British Columbia and Alberta—the areas least known in the time of Asa Gray.

The group of *Ranunculi* studied most thoroughly in the field is the *Ranunculus occidentalis* complex, and the results of the investigation are presented in the main text and in notes under individual species and varieties of the group. The web of interrelationships involving *R. occidentalis, R. acri-*

formis, R. californicus, R. canus and *R. hexasepalus* is so complex that a number of nomenclatorial recombinations and some new names have been necessary in order to bring classification into harmony with the results of field studies of all but one rare species of the five and all but two of the seventeen varieties occurring from British Columbia southward. Many of the connecting biotypes are restricted to one locality or, so far as is known, even to a single colony, and relatively few of the lines of relationship between any two species could have been traced fully through previously collected herbarium material.

The three observations below may serve as examples of numerous field studies on the *Ranunculus occidentalis* complex and on other species groups:

1. *Interbreeding of Two Species.*—*Ranunculus californicus* and the related *Ranunculus occidentalis* var. *Eisenii* are segregated geographically, except in the region about fifty to seventy-five miles north of San Francisco Bay in California. Consequently, a search was made in northern Napa and Sonoma counties to determine the degree of character recombination among colonies of these two species. In two colonies, one about two miles north of Healdsburg and the other at the south base of Mt. St. Helena, the 9-16 petals of *R. californicus* and the 5 or 6 of *R. occidentalis* were found in various combinations with the other characters of both species (Healdsburg, Sonoma Co., *L. Benson 6404, Pom-B, 6405, Pom-B;* Mt. St. Helena, Napa Co., *L. Benson 6246-8, Pom-B.*) These recombinations are taken as an indication that the two species may interbreed in the areas where they are not segregated by geographical barriers.

2. *Ecologically Differtiated Biotypes.*—Two ecological forms of *Ranunculus occidentalis* var. *Eisenii* have been found to be common throughout the range of the variety. One has relatively small, simple, 3-cleft basal leaves and occurs beneath oak trees on vernally moist north slopes; the other usually has somewhat larger pinnate leaves with 3 leaflets and occurs in vernal meadows and along seasonal rivulets. Plants of the two forms were transplanted from near Kelseyville, Lake County, California, to a uniform environment in adobe soil at Menlo Park, San Mateo County, California, and the original leaf forms were maintained as new foliage was produced in cultivation. After random pollination, seeds from each of the original plants were grown side-by-side in separate flats in a greenhouse at the University of Arizona, and leaves of both types appeared among the progeny of both plants. It is concluded that the leaf characteristics observed in the field are hereditary and not mere modifications caused directly by the environment.

3. *Duration and Flowering Periods of a Species and Its Variety.*—At Seattle, Washington, in the spring of 1929 *Ranunculus uncinatus* var. *parviflorus* (*R. Bongardii*) was observed to grow, in at least some instances, from a perennial root, for dried stems from the previous season were attached to the underground parts of the plant. At the highway bridge at Sylvana in Snohomish County, Washington, during the same spring, seedlings of *R. uncinatus* (*R. Bongardii* var. *tenellus*) were followed from a stage just after sprouting through fruiting. Specimens were collected, as follows: April 20, 1929, *L. Benson 1164, Pom-B, DS, Wash;* May 11, 1929, *L. Benson 1377, Pom-B,*

DS, Wash. The observations at Seattle and at Sylvana were strengthened by finding var. *typicus* and var. *parviflorous* growing together in a uniform environment at Snoqualmie Falls, Washington, on May 4, 1929. Under these conditions, *R. uncinatus* was annual and the var. *parviflorus* was perennial (herbarium specimens for *R. uncinatus L. Benson 1228, Wash, Pom-B, DS, Mo, 1229, Wash, Pom-B, DS, Mo;* for var. *parviflorus, L. Benson 1230, Pom-B, DS, Wash, 1231, Pom-B.*) It is concluded that the difference in duration of the species and variety is determined by hereditary factors and not (at least under the conditions prevailing at Snoqualmie Falls) directly modified by the environment. Furthermore, the presence of a possible incomplete barrier to interbreeding of *R. uncinatus* and var. *parviflorus* was noted at Snoqualmie Falls. Var. *parviflorus* was producing only its first flowers, and var. *typicus* was in flower and young fruit. Cross pollination may be reduced by this difference in flowering season.

HERBARIUM STUDIES

The following is an alphabetical list of symbols adopted for the herbaria in which the specimens examined and cited are located. The writer is indebted to the owners and curators of the various herbaria for the use of the specimens. In most herbaria, the collections were examined in their entirety, but in a few only certain critical species or type specimens were borrowed for study. Citation of specimens is under two headings, as follows: *Specimens examined,* a complete list for the species or variety, and *significant specimens,* including those collections of common or well-known plants which are of interest for one special reason or another—frequently those from areas on the edge of the geographical range. More specimens are cited for the species and varieties occurring in Alaska, the western provinces of Canada, and the Western States than for the East and Middle West because there are far more species in the western regions, because there is a greater number of critical species groups, because the physiographic features of the West are far more complicated, and because reference to occurrence in particular states is far less specific, some of the western counties being larger and far more varied floristically and physiographically than some eastern states. Since the species of *Ranunculus* occurring in Mexico, Central America, and the West Indies have had no previous critical treatment and since the confusion in the herbaria has been almost complete, all the specimens from those areas examined by the writer are cited. Citation sequence proceeds from west to east and north to south, following on the map essentially the movements of the eye in reading a printed page.

Can, National Herbarium of Canada, National Museum of Canada, Department of Mines and Resources, Ottawa, Canada.
CAS, California Academy of Sciences, Golden Gate Park, San Francisco, California.
Chr, Herbarium of Mr. J. H. Christ, Portland, Oregon.
Clo, Herbarium of Mr. Ira W. Clokey, University of California Herbarium, University of California, Berkeley, California.
Colo, University of Colorado Museum, University of Colorado, Boulder, Colorado.
Crn, Herbarium of Cornell University, Ithaca, New York.
CSC, Herbarium of Colorado State College, Fort Collins, Colorado.
DS, Dudley Herbarium, Stanford University, California.

F, Field (now Chicago) Museum of Natural History, Chicago, Illinois.
Farwell, Herbarium of Mr. O. A. Farwell, Lake Linden, Michigan.
Fla, University of Florida, Gainesville, Florida.
Gar, Herbarium of Mr. A. O. Garrett, Salt Lake City, Utah.
GCNP, Herbarium of the Grand Canyon National Park, Grand Canyon, Arizona.
GH, Gray Herbarium, Harvard University, Cambridge, Massachusetts.
HGr, Herbarium Greeneanum, University of Notre Dame, Notre Dame, Indiana.
Ill, Herbarium of the University of Illinois, Urbana, Illinois.
ISB, University of Idaho, Southern Branch, (now Idaho State College) Pocatello, Idaho.
ISC, Herbarium of Iowa State College, Ames, Iowa. The specimens examined are those of Mr. J. P. Anderson.
J, Working collection of the late Dr. W. L. Jepson, Department of Botany, University of California, Berkeley, California.
Kans, Herbarium of Kansas State College, Manhattan, Kansas.
Mich, Herbarium of the University of Michigan, Ann Arbor, Michigan.
MNA, Museum of Northern Arizona, Flagstaff, Arizona.
Mo, Missouri Botanical Garden, St. Louis Missouri.
NR, Herbarium "not recorded." From 1929-1931, while preparing a Master's thesis on the Pacific States *Ranunculi* and until 1932, the writer did not record the herbaria in which specimens were located, and the specimens listed with the symbol *NR* are the ones examined during that period. Those located at Stanford University, the University of California, Pomona College, Washington State College, and the California Academy of Sciences all have been reëxamined, and they are noted by the proper symbols. This is true also for some specimens from the United States National Herbarium (Pacific States collections), the University of Oregon, Willamette University, and Oregon State College, but not for all.
NY, New York Botanical Garden, Bronx Park, New York City.
OSC, Oregon State College, Corvallis, Oregon.
PA, Academy of Natural Sciences of Philadelphia, Pennsylvania.
Pom, Herbarium of Pomona College, Claremont, California.
Pom-B, Herbarium of Lyman Benson, Pomona College, Claremont, California. This collection has been given to Pomona College, and since it is being integrated with the Herbarium of Pomona College, hereafter a separate designation will be unnecessary. In several previous papers this collection has been given the symbol *B*, and earlier citations may be correlated with those listed here as *Pom-B*.
RM, Rocky Mountain Herbarium, University of Wyoming, Laramie, Wyoming.
Sac, Herbarium of the United States Field Station, Sacaton, Arizona.
SBM, Santa Barbara Museum of Natural History, Santa Barbara, California.
SD, San Diego Society of Natural History (Museum), San Diego, California.
SRJC, Santa Rosa Junior College, Santa Rosa, California.
TAg, S. M. Tracy Herbarium, Texas Agricultural Experimental Station, College Station, Texas.
Tex, University of Texas, Austin, Texas.
UA, Herbarium of the University of Arizona, Tucson, Arizona.
UA-Shr, Herbarium of Forrest Shreve, University of Arizona, Tucson, Arizona. Just before leaving the University of Arizona faculty in 1944, the writer arranged for the purchase by the University of the herbarium of Dr. Forrest Shreve, Carnegie Institution of Washington, Desert Laboratory, Tucson, Arizona.
UC, Herbarium of the University of California, Berkeley, California.
UO, Herbarium of the University of Oregon, Eugene, Oregon.
UPa, Herbarium of the University of Pennsylvania, Philadelphia, Pennsylvania.
US, United States National Herbarium, United States National Museum, Smithsonian Institution, Washington, D. C.
USNA, United States National Arboretum, Division of Plant Exploration and Introduction, Bureau of Plant Industry, Etc., Washington, D. C.
Utah, Intermountain Herbarium, Utah State Agricultural College, Logan, Utah.
WSC, Herbarium of Washington State College, Pullman, Washington.

Wash, Herbarium of the University of Washington, Seattle, Washington, including the Herbarium of Mr. J. W. Thompson, cited previously as *T*.
WillU, Herbarium of Willamette University, Salem, Oregon.

Diagnostic Characters

All parts of the plant have yielded valuable diagnostic characters for segregation of individual species or for delimitation of subgenera and sections. However, certain vegetative and floral parts have been of particular taxonomic use in *Ranunculus*, and some of these have not been investigated consistently by previous students of the genus. The nectary scale, an organ scarcely studied since 1754 (Linnaeus, 1754), has been of remarkable value. Since some of the most original work of the present study has dealt with that morphological character, it is taken up first, and other characters are taken up afterward. The order of treatment of the other characters is that used in writing descriptions of the subgenera, sections, species, and varieties. Primary importance, *per se* is not assigned to any character, since obviously, the significant diagnostic character in any case is the one which reflects a constant genetic difference between groups and not a character associated necessarily with some particular organ as many authors have intimated.

The Nectary Scale

The presence of the scale covering the nectary on the ventral side of the base of the petal blades in *Ranunculus*, has been known for many years. Linnaeus (*loc. cit.*) made the following statement, "Nectarium hoc in aliis porus nudus, in aliis margine cylindraceo cinctus, in aliis squammula emarginata clausus." This was translated by J. E. Smith (in Rees, 1819) as follows: "The nectary scale in *Ranunculus*, says Linnaeus, is, in some species, a naked pore; in some it is bordered with a cylindrical margin; in others closed with a notched scale." According to Smith (*loc. cit.*), "The essential mark of the genus consists, as Linnaeus remarks, in the nectary, the rest of the parts being uncertain; hence he takes occasion to point out the use of adverting to that organ, which before his time had been neglected, and which his opponents accuse him of sometimes making of too much importance. . . ."

Apparently no one since Linnaeus has checked the variability of the nectary scale in the various subgenera, sections, and species of *Ranunculus*, and the literature of the subject is meager. It consists of a fair discussion of some groups by Prantl (1887) and of a few fragments, as follows: The absence of the scale in the subgenus *Batrachium* is treated not infrequently in standard manuals (e. g. Robinson & Fernald in Gray, 1908; Jepson, 1923-5) as a distinguishing feature of the subgenus. W. B. Drew, (1936) made the following statement concerning *Batrachium*, "The nectarial scales at the base of the petals are, according to Freyn (*l. c.*) [Beih. Bot. Cent. 6: 11. 1881], consistently round; but my studies show that the nectaries vary considerably in their development within a given species. Indeed the simple round type is scarcely present in most petals of our North American Species." Parkin (1928) pointed out that the nectary scale of *Ranunculus flabellaris* (*R. delphinifolius*) differs radically from the simple type occurring in such species as *Ranunculus*

acris, R. repens, R. occidentalis, and *R. californicus,* which are studied sometimes in elementary taxonomy.

The present study of *Ranunculus* has revealed six types of nectary scales, as follows: (1) a transverse ridge basal to the gland; (2) a simple flap; (3) a pocket (4) a forked structure produced distally and sometimes finally free from the petal at the tips of the two branches of the scale; (5) a circular or obovate border; (6) differentiation of a primary scale, which bears the gland on its ventral surface, and of a secondary scale, which forms a pocket enclosing the gland. Scales of any of the six types may be proximally truncate, rounded, or angular and distally truncate, emarginate, 3-lobed, curved outward, or curved inward. Commonly the scale is glabrous, but in some species the distal margin is ciliate, and sometimes the neighboring surface of the petal also produces hairs. In some species the nectary scale is variable, but in most it is not variable in form, and in nearly all it is of a constant basic type. Moreover, particular basic types almost consistently characterize the subgenera and sections of the genus, as previously delimited in an earlier paper (L. Benson, 1940b), wherein the nectary scales are discussed more fully and illustrated. Much of the brief discussion is repeated from the earlier paper.

The relationship of the six types of nectary scales to the classification of the North American subgenera and sections of *Ranunculus* is indicated in the following list:

Subgenus I. EURANUNCULUS.
- Section 1. *Chrysanthe.* Type 2, except *R. recurvatus* type 3.
- Section 2. *Echinella.* Type 2 or 3.
- Section 3. *Epirotes.* Type 3, except *R. Eastwoodianus* type 4.
- Section 4. *Flammula.* Type 3.
- Section 5. *Hecatonia.* Type 3, 4, 5, or 6.

Subgenus II. CYRTORHYNCHA.
- Section 1. *Halodes.* Type 2.
- Section 2. *Eucyrtorhyncha.* Type 1.
- Section 3. *Arcteranthis.* Type 4.
- Section 4. *Pseudaphanostemma.* Type 4.

Subgenus III CERATOCEPHALUS. Type 2.

Subgenus IV. OXYGRAPHIS. Apparently type 1.

Subgenus V. CRYMODES. Type 4.

Subgenus VI. BATRACHIUM. Type 3 or 4 or obsolete.

Subgenus VII. PALLASIANTHA. Type 3.

Subgenus VIII. COPTIDIUM. Type 3.

Subgenus IX. FICARIA. Type 3.

There is danger that any new tool may be overworked in the study of taxonomic groups, and the writer is fully aware of the inadvisability of discounting other characteristics in favor of the convenient and useful nectary scale forms. The object of this investigation of an obscure and neglected morphological character is not to construct a new scheme of classification, but rather to proceed one step further than others have gone in securing *all* the information necessary for an accurate taxonomic study.

VEGETATIVE PARTS

1. *Roots.*—Enlarged or tuberous storage roots occur in several species, including *R. geoides, R. fascicularis, R. arizonicus* var. *chihuahuanus, R. Donianus, R. Jovis, R. Gormanii, R. Populago,* and *R Ficaria.* In these species, their presence is a constant character, but the three species in the *R. abortivus* group show some variability in root type.

2. *Stolons.*—The ability or lack of ability of the stem to produce roots at its nodes is of remarkable constancy and of considerable value in writing keys. It appears to be inconsistent in one species, *R. Macounii,* and its unfailing presence in others is not shown in specimens, but the potential ability or lack of it to produce nodal roots is the real diagnostic character, and plants of *R. Macounii* lacking the roots probably reflect environmental conditions or careless collecting.

3. *Leaf Types.*—Besides having value in segregation of some individual species and in characterization of most of the monotypic subgenera and sections, leaf type sets off with clarity every species of the section *Flammula* from all others, since *both* the cauline and basal leaves are either entire or or merely serrulate or wavy margined. Variability of leaf type in *Ranunculus* should be the outstanding example for a genus.

Reproductive Parts

1. *Calyx.*—a. *Number of Sepals*: The usual number is five. However, presence of only 3 or rarely 4 is a new and useful character for segregation of three subgenera, cf. key on pages 23-4. In one newly described species, *R. hexasepalus* L. Benson, the sepal number is almost constantly six, a number unique in *Ranunculus,* except in one specimen of *R. acriformis* var. *montanensis.* b. *Habit*: A clear line of demarcation segregating a number of groups of species is found in the spreading or reflexed habit of the sepals. A curious point, however, is the fact that when the flowers open indoors, some species normally with a reflexed calyx frequently have spreading sepals! c. *Special Pigmentation*: The species of the section *Epirotes* usually have a dash of lavender or purple pigment on the dorsal side of each sepal, and this character is an aid in segregation of the section from the related section *Chrysanthe,* in which purple or lavender pigmentation is uncommon. In *Ranunculus hystriculus* the white sepals greatly exceed the petals and take over their function of insect attraction. d. *Comparative Length of the Sepals and Petals*: Relative length of calyx and corolla members distinguishes a number of groups of species and many individual pairs of species. However, any comparison of the lengths of the organs must be based upon fully developed flowers, for the petals elongate rapidly in early anthesis, cf. data under *R. macranthus,* pages 104-5. e. *Pubescence*: A group of three species in the section *Epirotes* (*R. Macauleyi, R. nivalis,* and *R. sulphureus*) and a single species of the subgenus *Crymodes* (*R. glacialis*) are marked strikingly by stiff, reddish-brown dorsal hairs on the sepals. f. *Persistence*: There is considerable variability in the relative time of falling of the sepals and petals. However, the sepals are persistent until the plant is in fruit in only three subgenera, and this character is therefore of considerable diagnostic value.

2. *Corolla.*—a. *Number of Petals*: The number is prevailingly five. However, smaller numbers or even no petals may occur. Consistently apetalous species have not been found, although apetalous forms have been described erroneously as new species in various groups, reflecting usually the views of authors who consider one character to be, *per se,* "fundamental" and another not. A few species in various groups have more than five petals, and this

point is often a key character. b. *Color of Petals*: Petal color is of considerably more reliability in *Ranunculus* than in some other genera. Anthocyan pigments are rare in the corolla, and yellow is almost universal in the genus. However, two subgenera are distinguished clearly and reliably by the presence of white (*Batrachium*) or red petals (*Crymodes*). Most yellow petals become white in age as the pigment disappears leaving only the color of the oblique, sta ch-filled surface cells, which, in anthesis, give the petal its gloss (Parkin, 1928). At least one "new species" has been based upon such "white" petals. c. *The Nectary Scale*: (Discussed above.) d. *Length*: (Cf. data on enlongation during anthesis under *R. macranthus*.)

3. *Androecium*.—Curiously enough, related species rarely can be distinguished by their stamen characters.

4. *Gynoecium*.—Characters of the ripe carpels may exceed even the nectary scale in taxonomic usefulness. However, they have been more thoroughly studied in the past, and consequently fewer new observations on them have been recorded in this study. a. *Head of Carpels*: The shape of the fruiting head and the number of carpels entering into it are of considerable diagnostic value. For example, the section *Epirotes* is characterized by cylindroid fruiting heads. b. *Fruit Type*: Most species of *Ranunculus* have achenes, but in some of the smaller subgenera the ripe fruits may be utricular, and in the subgenus *Ceratocephalus* there are 2 empty lateral supplementary vesicles and perhaps sometimes 3 ovules. c. *Comparative Measurements*: Relative dorsoventral and lateral measurements of the fruits are substituted for the vague terms "compressed" and "turgid" and, as the result of measurement of the fruits of all the species, a reliable character for segregation of the sections *Chrysanthe* and *Epirotes*, which include more than half the American *Ranunculi*, has emerged, cf. key to the sections of *Euranunculus*. d. *Pericarp*: The thickness, texture, and strength of the pericarp characterize various subgenera, and the section *Echinella* is segregated by the papillae or spines which beset the fruit. Transverse corrugations distinguish the subgenus *Batrachium* from all other *Ranunculi*, except *R. sceleratus* var. *typicus*, and longitudinal nerves set off the subgenera *Cyrtorhyncha* and *Oxygraphis*. e. *Achene Beak*: Remarkable and important variations in length and curvature of this organ distinguish numerous species, and the beak of the fruit is almost as useful as the body.

5. *Receptacle*.— The chief taxonomic significance of the receptacle is in its determination of the size and shape of the head of fruits. In some species the receptacle enlarges scarcely at all after anthesis, but in others it grows to many times its former length, and it may change also in diameter. Hairiness or lack of it on the receptacle is of considerably greater constancy than pubescence on the vegetative parts, and apparently the genetic factors controlling it are independent of those determining vegetative hairiness.

Geographical Distribution

The area studied in this work embraces all North America in the broadest sense (that adopted for the North American Flora of the New York Botanical Garden), and it includes Greenland, Iceland, and the West Indies.

THE NATURAL VEGETATION AREAS OF NORTH AMERICA

Numerous systems have been proposed for classification of the natural vegetation areas of North America. None of these is wholly satisfactory, and it is not to be expected that any "system" can be very near perfection.

The Merriam System (Merriam, 1898) of life-zoning offers a workable scheme for Washington, Oregon, California, and western New Mexico, but its application to the Rocky Mountain System is somewhat dubious, and matching of areas in the West with supposedly corresponding areas in the East finds little support from a study of the vegetation. The weakness of the Merriam System, as repeatedly pointed out, lies in overemphasis of the rôle of temperature in determining plant distribution and in subordination of the water supply and other factors. This leads to an attempt, for example, to correlate the vegetation of the humid, densely-forested Carolinian Area in the East with the xerophytic sagebrush, juniper-pinyon, and broad-leaf sclerophyll belts of the Upper Sonoran Area or Zone in the West. In reality, the Merriam System is an attempt to classify vegetation on predetermined grounds, that is, to prove that given areas must be related ecologically because the temperature is the same, almost regardless of other environmental factors and disregarding the actual floristic composition and paleobotanical origin of the flora.

The majority of ecologists have adopted one or another of the systems of classification of the type presented by Shantz and Zon (1923) or Weaver and Clements (1938), that is, an arrangement according to vegetation climaxes as expressed in various formations and associations. Despite the value of such systems of classification for ecology, they are not wholly adapted to use in systematic botany, since the primary interest in this field is floristic, and classification by formations has some of the drawbacks of arrangement by life zones. For example, throwing together of the Arctic and Alpine areas, the San Joaquin Valley of California, the Palouse Region, the Desert Grassland, the Great Plains, and the central Prairies merely because grasses are dominant in them is unsatisfactory, since many of the areas have little else in common, at least floristically. It has been shown in an earlier paper (L. Benson, 1942a) that the chief distribution areas for *Ranunculus* do not correspond exactly with the ecological regions presented by Shantz and Zon, Weaver and Clements, or others.

A system of natural vegetation classification (for North America north of Mexico) based upon the relationships of the various regional floras and upon their geological history is presented in the paper referred to above. It is obvious that with the data available at present this must represent only groping toward the construction of such a system or, better yet, of a system based upon floristics, palentology, and ecology. Below the main outlines of this system (the one referred to throughout the monograph) are presented in the form of an annotated list, the North American floras and their chief subdivisions; some revisions in nomenclature are included. The reader is referred to the earlier paper for detailed discussion and presentation of data.

BOREAL FLORA

Concerning the floristic coherence of the Boreal Flora as a whole, the

most striking data from *Ranunculus* are concerned with the dominance of the section *Epirotes,* which is the major feature of each of the subdivisions (except the Northern Forest) and which, in its typical form, in America is restricted to them. The species, being of this section, clearly are related, but those of each major area are nearly all endemic.

1. *Arctic Grassland and Tundra.*—Represented around the world in Arctic regions, many of the species being circumpolar. This flora has followed the movements of glaciers and particularly the northward and southward migrations of the great ice sheets, and it is possible to trace the relationship of the *Ranunculi* and other groups growing in the polar regions to those in the ecologically somewhat similar alpine areas to the southward. Eight of the ten characteristic species of *Ranunculus* in the Arctic area of North America are in the section *Epirotes;* all the four endemics are of this section. This includes best the grassland and tundra of the mountains of the Atlantic seaboard.

2. *Alpine Grassland and Tundra.*—Apparently dominated by species left stranded after southward migrations of glaciers along the mountain chains and by species derived from such types. Twelve of the thirteen significant species of *Ranunculus* and all the eleven endemics are *Epirotes.* This is restricted to the West.

3. *Northern* (*Coniferous*) *Forest.*—In so far as evidence from *Epirotes* is concerned, this area is anomalous, and in the earlier article (p. 496) the absence of the section from the Northern Forest is explained by the current lack of aggessiveness of its species and their apparent lack of ability to reoccupy rapidly the areas denuded by glaciers in the Pleistocene Epoch. Relationship of this floral area to the other floristic regions dominated by the Boreal Flora is based upon other plant groups. There are almost no significantly characteristic endemic *Ranunculi* of any group. Most of the few species are subboreal circumpolar types or aquatic or palustrine forms. This lack of endemism is true also of the rest of the flora.

4. *Rocky Mountain* (*Subalpine and Montane*) *Forests.*—The Rocky Mountain Forests have few *Ranunculi* in common with either the areas to the east or those to the west, and they are not regions of such high endemism as are the Pacific Region and the East and Middle West. In *Ranunculus* and in the gymnosperms and pteridophytes (cf. p. 495 of the earlier paper) relationship is to the flora occurring in the similar forests in northern Eurasia and to the Arctic flora. On the other hand, the Rocky Mountain Forests and particularly the montane ones have been intruded by many other species and species groups from neighboring areas on all sides during the millions of years since the Rocky Mountains became a significant mountain system toward the end of the Mesozoic Era (or at least since they became reëstablished in middle Tertiary). Numerous species of *Ranunculus* belonging to groups much better developed in neighboring areas have one or two species or varieties penetrating for varying distances into the adjacent portions of the Rocky Mountain Forests. The evidence from *Ranunculus* supports the belief that the basic relationship of these forests is with circumpolar vegetation, since eleven of the nineteen significant species and varieties and nine of the fourteen endemics are of the section *Epirotes.*

PACIFIC NORTHWESTERN FLORA

In the middle portion of the Miocene Epoch the plain extending from the Pacific Ocean to the Rocky Mountains was occupied from about the latitude of San Francisco northward by a redwood forest similar to the type now relict in northwestern California and (without the redwoods) from Alaska to Western Oregon and in parts of northern Idaho and western Montana. With the subsequent uplift of the Cascade-Sierra Nevada mountain axis in late Miocene and early Pliocene, the rainfall and temperature minima in the Columbia Basin and the Great Basin were reduced considerably, and the temperature maxima were increased. Interior mountain areas with these new conditions were developed from Washington to California (cf. Chaney, 1925, 1938).

1. *Pacific* (*Coniferous*) *Forest.*—The species occurring today in the relatively little-modified Pacific Forest may be the prototypes of complexes represented both there and in the Sierran Forests of the mountains of the interior. Several groups of *Ranunculi* show distributional evidence in harmony with this hypothesis.

2. *Sierran* (*Subalpine and Montane*) *Forests.*—The species complexes of the Pacific Northwestern Flora may have originated along with the differentiation of climates resulting from the uplift of the mountain axis. Some of the Sierran Forest species are identical with those of the Pacific Forest; some are related closely; but some others must have intruded the area from other regions.

SIERRA MADREAN FLORA

In middle Miocene, when the redwood forest occupied the northern half of the plain from the Pacific Ocean to the Rocky Mountains, the southern half of the plain was characterized by an oak woodland vegetation which had migrated northward from the Sierra Madre Occidental in Mexico in Oligocene and early Miocene times. With the uplift of the Sierra Nevada in late Miocene and early Pliocene and the consequent development of a continental climate (colder, drier winters and hotter summers with typically summer rain) east of the new mountain axis, the Sagebrush Desert and the Juniper-Pinyon Woodland developed in and near the Great Basin (Cf. Axelrod, 1940). Differentiation of various vegetation types west of the main axis occurred with the arising of lesser mountain barriers nearer the coast, creating in California a highly variable climatic region of subdivisions with warm-to-cool, wet winters and cool-to-hot, dry summers.

1. *Southwestern Oak Woodland and Chaparral.*—The nearest approach to the prototype of the group, with relatively little modification. The growing season is in July and August, and the spring is cold until it is too late for much plant growth. There are few *Ranunculi*, and these are Mexican types.

2. *California Oak Woodland.*—Best developed in Northern California and southwestern Oregon; not altogether distinguished from the Chaparral in Southern California; often occurring on north slopes where the chaparral is on nearby south slopes. Differentiation from the Southwestern Oak Woodland and Chaparral is very strong but the basic floristic relationship is definite.

For example about fifteen species of oaks occur in California and about thirteen in Arizona and New Mexico, and, although only two varieties of species occur in both areas, the same general groups are found. The California Oak Woodland supports a dense growth of annual grasses and other herbaceous plants during the moist lush winter and spring growing season, and among the herbaceous perennials are *Ranunculi* of the section *Chrysanthe* and largely of the *R. occidentalis* complex, which is characteristic also of the Pacific Forest from whence the species probably are migrants. Most of the *Ranunculi* are in this vegetation type, and they are rare in the others.

3. *California Chaparral.*—Best developed in Southern California, but occurring also characteristically in well-differentiated large areas in Northern California. There are several phases including those dominated by chamise brush (*Adenostemma fasciculatum*) and by scrub oaks. A type possibly worthy of segregation is the Coastal Sagebrush which occurs chiefly in washes and other areas with gravelly soil. There are no *Ranunculi.*

4. *Pacific Grassland.*—Possibly (before the coming of European man) a relict type of bunch-grass prairie; otherwise partly a selection of annual grasses and mostly annual herbs from the adjacent Oak Woodland, partly a selection of Sagebrush Desert plants (introduced through the gap of Pit River) and Mojave Desert plants (introduced through Walker, Tehachapi, and Tejon passes), and partly a strong backbone of mostly endemic herbaceous species. A single *Ranunculus* (*R. californicus* var. *rugulosus*) is endemic along the rivers and the irrigation ditches fed by them. The area is one of low rainfall (5-10 inches), relatively mild winters, and hot summers.

5. *California Coastal Relict Forest.*—This type is not well developed at present except on the islands off the coast of Southern California, on the Mendocino County coastal plain, on the Monterey Peninsula, and in scattering localities on the Southern California coast. Such narrow endemics as *Lyonothamnus floribundus, Pinus radiata, Pinus muricata, Pinus remorata, Pinus Torreyana, Cupressus Goveniana, Cupressus pygmaea, Cupressus macrocarpa,* and numerous shrubs and herbs of the islands are included in the characteristic vegetation, which once covered a continuous coastal region now submerged except for the relict areas listed above. On the mainland in particular this vegetation type is intruded highly by species from the adjacent Pacific Forest (northward) and the Oak Woodland and Chaparral (southward). The only *Ranunculus* possibly referrable to this type is *R. californicus* var. *cuneatus,* which is characteristic, actually, of the ocean bluffs (cf. below).

6. *Juniper-Pinyon Woodland.*—At higher levels in the Great Basin, along particularly the western and southern edges of the Rocky Mountains, and in northern Mexico. Few *Ranunculi.*

7. *Sagebrush Desert.*—Relict areas in the Columbia Basin; Great Basin and eastward through the gap in the Rocky Mountains in southern Wyoming and southeastward to the Little Colorado River in Northern Arizona. The *Ranunculi* are restricted largely to aquatic and palustrine types, but there are a few characteristic species such as *R. glaberrimus* and the remarkable relict endemics, *R. Andersonii* and *R. juniperinus* (subgenus *Crymodes*), which occur also in the adjacent Juniper-Pinyon Woodland.

PLAINS FLORA

The relationship of these grasslands is with, in large measure, vegetation types occurring in Mexico, as shown by many genera of grasses (e. g. *Bouteloua*).

1. *Desert Grassland.*—Occurring principally in Arizona, New Mexico, western Texas, and northern Mexico. In Arizona and New Mexico, it is chiefly at about 3,500 or 4,000 to 5,000 feet elevation, just above the Mexican Deserts and below the Southwestern Oak Woodland and Chaparral. The growing season is in the summer (July and August), and the spring is very dry after the weather is warm enough for plant growth. No *Ranunculi.*

2. *Plains Grassland.*—Great Plains region. The few *Ranunculi* include *R. rhomboideus* (characteristic also of the Prairie) and *R. acriformis,* an endemic.

PRAIRIE FLORA

This type is not well enough known to the writer for evaluation. It shows some affinity to the Plains Flora and some to the Deciduous Forests as well as characteristics of its own.

EASTERN AND MIDDLE WESTERN FLORA

As with the Pacific Coast region, the East and Middle West comprise an area of high endemism, and this is reflected in the various compact groups of endemic species of *Ranunculus* with relationships to species groups occurring in various directions. The high percentage of endemism indicates the antiquity of the probable separate invasions of the prototype of these groups. (The groups and their relationships are summarized on page 497 of the earlier paper.)

1. *Deciduous Forests* (with Subdivisions).—Most of the *Ranunculi* occur in these forests. The lesser experience of the writer in the eastern areas has not been sufficient to reveal clearly all the correlations between *Ranunculus* and the subdivisions of the Deciduous Forests.

2. *Southeastern Riverbottom Forest.*—*Ranunculi* are either aquatic or palustrine types or terrestrial species restricted to the peripheral areas.

3. *Southeastern Pine Forest.*—Largely on the Atlantic Coastal Plain and in Alabama and Georgia.

ATLANTIC COASTAL PLAIN RELICT FLORA

As pointed out by Fernald (1911, 1917) many typical western European species unknown as native plants elsewhere in North America occur in southeastern Newfoundland, and they appear also in some other areas on the Atlantic Coast, including southern Nova Scotia and the coastal region from southeastern Pennsylvania to Chesapeake Bay and southeastern Virginia. *Ranunculus Flammula* and *R. hederaceus* are among these characteristic relict species.

MEXICAN DESERT FLORA

The characteristic marker of this flora is the creosote bush, *Larrea divaricata.* Migration northward occurred probably after uplift of the Sierra Nevada

and the mountains of Southern California. The desert is an area of very low rainfall, mild winters, and hot summers, characteristically with light winter rainfall and somewhat heavier summer rainfall. However, in California, where the desert is less rich in summer-germinating trees, shrubs, perennial grasses, and cacti, there is in many areas only winter rainfall favoring the annual herbs. There are no *Ranunculi* other than the few aquatic or palustrine types along the Mojave and Gila rivers.

1. *Mojave Desert.*—At about 2,000 to 3,500 or occasionally 5,000 feet elevation in the northern part of southeastern California, southern Nevada, southwestern Utah, and in northwestern Arizona from the Bill Williams River area northward. The Joshua Tree (*Yucca brevifolia*) is a characteristic species of the higher areas.

2. *Sonoran Desert.*—Represented north of Mexico by the following subdivisions: a. *Colorado Desert.* Elevations from —200 to 1,500 feet; poor in shrubs, trees, perennial grasses, and cacti because of low summer rainfall except on occasional years; rich in annuals because of winter rains. b. *Arizona Desert.* Elevation from 1,500 to 3,000 or 3,500 feet; rich in shrubs, trees perennial grasses, and cacti and many other species having relationships in Mexico.

3. *Chihuahuan Desert.*—Southeastern Arizona and parts of southern New Mexico; Trans-Pecos Texas; northern Mexico; up to at least 5,000 feet elevation; summer rainfall predominant, the winter precipitation unimportant.

SUBTROPICAL FLORA

Chiefly in southern Florida and to some extent along the Gulf of Mexico, particularly near Brownsville, Texas. No *Ranunculi.*

COASTAL FLORA

Each type developed in various ways on the different coasts. In particularly Southern California there is a close relationship of many species of all three subdivisions to those in the deserts. There are no *Ranunculi,* except on the bluffs northward. *R. californicus* var. *cuneatus* is the only characteristic variety.

1. *Strand Vegetation.* Beaches and sand dunes; 2. *Bluff Vegetation;* 3. *Saltmarsh Vegetation.*

The position of the Palouse Prairie is open to question. It has characteristics of the Pacific Forest, the Sierran Montane Forest, and the Sagebrush Desert, and the *Ranunculi* are species best developed in these vegetation types. However, there are endemic species of other genera, and the exact extent of the endemic flora is not known to the writer. It is possible that the *Ranunculi* represent merely intrusions upon the Palouse Prairie Flora and that it is a significant type in itself or it may be merely a selection from neighboring types and there may be relatively few characteristic species. According to Daubenmire (conversation in 1947) the Palouse Prairie Flora is a distinctive type. The writer's observations in this region (in 1929, 1930, and 1933) have not been adequate for formation of a decision.

Policy in Classification

Concept of Genera

Ranunculus is interpreted here according to a conservative point of view, and various groups segregated by one author or another as genera are included. These segregations have been based upon piecemeal studies involving usually only a few species occurring in a restricted geographical area or in some cases they have been the result of application of a very liberal or radical policy concerning the breadth of genera to all the groups with representatives within a restricted area. In no case have they been based upon a thorough investigation of the genus *Ranunculus* and its close relatives. In most cases the segregated genus has consisted of only the extreme variant species in a group of several occurring mostly outside the range under consideration. The writer has no objection to removal of some groups from *Ranunculus,* but, if segregations are to be made, they should follow natural lines rather than involving removal of some one species which strikes the fancy of the investigator. In short, a dissection of the genus into various major divisions should follow natural lines of division comparable to dissection of the human body at the shoulders and thighs rather than removal of a finger here and a toe, knee, wrist, or elbow there. Raising of each of the subgenera to generic status would be a natural arrangement, acceptable according to a liberal point of view. Raising of the sections of *Euranunculus* to generic status would require a radical point of view, so radical as to be nonsense. Raising the sections of *Cyrtorhyncha* to generic status would require liberalism.

Concept of Species and Varieties

The writer has summarized his concept of species and varieties as well as other categories in an earlier paper (1943) as follows:

> No organism ever has been thoroughly known. Not even the vinegar fly, *Drosophila,* despite the endless experiments of geneticists, is completely understood, and probably it never will be. The taxonomist, drawing upon the field and herbarium for data and often obtaining additional information by experiment [or gathering other data from the fields of paleontology, genetics, cytology, microscopic morphology (including embryology and ontogeny), physiology ,and ecology], determines much that is significant, but no matter how long he may search or how many experiments he may conduct, he still has not the complete story. He must draw tentative conclusions from incomplete data or draw none at all. He is forever approaching the truth, but he never quite reaches it. . . .
>
> Classification of living plants and animals is not like arrangement of postage stamps, coins, or other objects created largely according to prearranged plans or according to more or less orderly systems. Living things have evolved in hit or miss fashion during the course of many millions of years, and their progress has not been in simple, linear sequence such as the fancied series directly from "amoeba to man." The course of evolution has been irregular, and the many branches of development have changed directions frequently according to alterations of climate and ecological [or biotic] conditions in the various geological periods. Rather than being a series of single steps from the algae to the flowering plants, the course of development within the plant kingdom may be likened to the following. Suppose that a male and a female weevil were placed in the center of the stored wheat in a full grain elevator. Being fruitful and multiplying, these parents might give rise in time to enough weevils to infest the entire elevator. Then, by tracing the tracks of all the weevils from the beginning, one might be able

to construct a diagram of about the same complexity as the one needed to represent the course of development in the plant kingdom.

The notions of fixity of species and of actual existence of clearly defined species or other categories must be discarded if one is to understand the problem of classification. The names as applied to plants and animals represent only more or less recognizable populations. Often the populations are as variable as human beings or dogs, for there may be several budding lines of evolution within them, and frequently intergradation of major populations is so nearly complete that it is difficult to tell where one begins and the other ends. Distinctions rarely are clear cut, and most species include a broad range of variants, many of them adapted to particular ecological conditions and some of them isolated in specific geographical regions during thousands or millions of years and differing much or little from the other phases of the population. Conspicuous or striking characters apparently setting off particular groups as separate entities may break down completely after study, and it is obvious that the differentiation of groups is not a matter for snap judgment.

Species and other categories are not necessarily always of the same degree of distinctness. Some are of the type that anyone may recognize and upon which all may agree—marked by an abundance of stable characters and with slight or no variation. Others are as difficult to define as the races of dogs, for the mongrels exceed the pure-breds, and many of those which are hardly to be called mongrels are off type. In these cases it may be possible to define only the extreme forms or to describe the range of characteristics within the entire group. In other cases, the plastic mass of related forms may be capable of segregation into two or more groups with some degree of distinctness and with far fewer intermediates than extremes.

Obviously the groups to be assigned scientific names must be natural. They must not be so finely subdivided that a similar system applied to human beings would call for consideration of a brown-eyed man as a different species from his blue-eyed mother or father. Persons adopting such narrow and unnatural divisions are known as "splitters." As an example, in 1905 a particular author decided that there were not six or eight species of *Eschscholtzia* but one hundred and twelve, and most of these were forms of the California poppy, *Eschscholtzia californica*. The California poppy varies somewhat, and there are a number of minor local forms in which particular characters are predominant much as certain human genetic characters are more common in Ireland than in France although they are all to be found in both countries. Furthermore, the California poppy has a distinctive habit of its own. In the perennial forms, the stems arising in early spring are robust and they bear relatively large greenish leaves, and flowers with a predominance of orange and with a relatively large torus (platform) at the base of each. As the season advances through late spring and summer, the old stems die and the new stems are progressively more slender and with smaller bluish leaves and smaller yellow flowers with the torus relatively narrower. The plants named in 1905 as different species were of no more stability and distinctness in their characters than the families of a Middle Western town might be in theirs, and many of them were merely seasonal forms of the same population. On the other hand, groups must not be so broad that they include elements not actually a part of the same genetic population. For example, lions and tigers obviously are closely related, since they have too many characters in common for their coincidence to be mere chance, but to consider them as the same species would be absurd ,since they are in no sense a part of the same genetic population. Persons adopting such broad and unnatural divisions are known as "lumpers."

Within the limits of distinctly natural populations, there is still much that must be settled by individual judgment, for many species include partly segregated populations differing from one another as do the principal races of human beings and with the points of difference more or less inconsistent in their occurrence and in their tendency to be associated with one another. Ever since a short time after 1753 when Linnaeus put into effect the (binomial) system of naming plants according to genera and species, there has been difference of opinion concerning the breadth of the range of types to be included in each category. The groups recognized by Linnaeus were

broad, and commonly taxonomists with a tendency to recognize broad categories have been known in the botanical vernacular as "conservatives." Those tending strongly away from the policies of Linnaeus have been dubbed "liberal" or "radical" according to degree. There has been a continuous line of conservatives, and schools of liberals have arisen at one time or another. Probably there will be always both points of view and varying degrees of intermediate opinion, since all viewpoints are tenable as long as the classification system is natural. Mutual agreement upon a standard is not possible because of the complexity of the problem and the individuality of human beings who work together only by agreement and not by coercion.

The test of a systematic botanist's work in classification is not whether he is conservative or radical but whether he organizes well. The same bit of research may be interpreted conservatively or radically without theoretical loss of value, and the following is an example.

The *Ranunculus occidentalis-californicus-canus* complex includes the best known buttercups occurring from Alaska to California and northwestern Wyoming. Within this complex there are three major groups, each, as it happens, with a separate geographical range but each with a common frontier with both of the others. Along these frontiers, it is possible to find here and there minor local populations displaying various recombinations of the characters of the two adjacent major populations, but each of these minor groups represents only a minute percentage of the complex as a whole. Within the group commonly called *Ranunculus occidentalis* there are eleven principal geographical populations distinguished by characters less stable than those segregating the three major members of the complex; within *Ranunculus californicus* there are four; within *Ranunculus canus* there are three. To summarize, according to the opinion of the writer, in addition to scores of minor variants there are eighteen populations of sufficient distinctness and stability of associated characers to be accorded scientific names. Some might consider these to be a single species with seventeen varieties besides the typical one; others might call them three species, each with the number of varieties indicated above; still others would recognize eighteen separate species. Any of these three interpretations could be defended. [Arrangement of species and varieties in this group has been altered slightly in the present monograph, emphasizing the main point of the paragraph.]

On the other hand, while any of the three interpretations might be acceptable upon theoretical grounds, there is a practical question to be considered. Which of the three interpretations is most nearly consistent with policies for classifying the entire plant kingdom prevailing in the world as a whole, as far as this can be determined? It is not desirable to have the names of plants in constant turmoil as different scientific papers and books come out, and the nearer all taxonomists can come to achieving a common policy the better, even though it is not to be expected that such an ideal as absolute unity of opinion can be attained. Therefore a system of classification of a particular group which is far out of line with the most generally adopted ones should be examined carefully to determine whether it possesses any particular merit which warrants its retention. Ultimately it should be a contribution toward a consistent system of classification of the entire plant kingdom or it should be rejected. For example, in 1902 a German botanist proposed that all of the plants in the mustard family should be considered as a single genus *Crucifera* instead of as many genera. This required endless recombination of names creating an arrangement wholly unfamiliar to anyone. Adopting it would require not only renaming the plants of the mustard family, but, for the sake of consistency, of all other families. As another example, from about 1906 to 1929 another author published an arrangement recognizing twenty-eight genera to represent the group commonly known as a single genus *Astragalus* (loco weeds). This required hundreds of new combinations of names, and for the sake of consistency of policy it should have required hundreds of thousands more for bringing the treatment of the other genera of the plant kingdom into harmony with the treatment of *Astragalus*.

Although the point of view of the writer is conservative, it is obvious from the treatise quoted above that other viewpoints should be treated with tolerance

and consideration. Numerous monographs of the past have lost their effectiveness from the standpoint of some users because the concept of species and varieties followed rigidly one interpretation without possibility of ready adaptation to other points of view. In other words a conservative interpretation of categories is difficult for a liberal to evaluate in terms of the treatment he thinks best for other groups, and a liberal interpretation is not wholly satisfactory to a conservative. With this point in mind, the writer (1936, p. 26) adopted the following plan for his revision of the Pacific States *Ranunculi*:

> *Ranunculus* and its species are here interpreted according to a rather conservative viewpoint . . . , and many described species are considered to be varieties instead. It is the opinion of the writer that the viewpoint of those botanists who prefer a narrow range of forms to be included in a category is exactly as worthy of recognition as is the interpretation of those who prefer a broader range. The results of this investigation of *Ranunculus* can be interpreted in the light of either conservative or liberal policy without loss of logic, and consequently, in order to be of aid to botanists whose concept of . . . species differs from that of the writer, more than one interpretation is given. . . . The varieties which according to differing opinion might be interpreted as distinct species have been marked. . . .

The prepublication reviewer for the *American Journal of Botany* described this as a "peculiar plan". Probably it is; so is any other innovation. Nonetheless, it is a plan much needed for monographic and perhaps for some other works. It would be of great help for example, in reconciliation of *Gray's Manual* (1908) and Britton and Brown's *Illustrated Flora* (1913) which cover primarily the same areas in northeastern North America and which because of differences in nomenclature and policy appear to the casual observer to be as unlike as though they dealt with the vegetation of Mars and Saturn. Much of the difference due to the conflicting rules of nomenclature can be reconciled with ease by use of the lists of synonyms given with Britton and Brown's species descriptions, but no means of reconciliation is available for the difference in policy concerning species. This represents a very great lack in Britton and Brown's *Flora,* which was based upon a departure from the policies used in most previous publications and well known to botanists and the educated public.

In the current treatise, the policy presented in 1936 is reaffirmed, and the following method of presentation is adopted. In the heading for each variety, which, within reason, might be interpreted as a species, the specific name to be used according to moderate or liberal policy is included. The following are examples:

6C. RANUNCULUS OCCIDENTALIS var. ULTRAMONTANUS Greene, Pittonia 3: 13. 1896. (Liberal policy: *R. alceus* Greene.)

11B. RANUNCULUS UNCINATUS var. PARVIFLORUS (Torr.) L. Benson. Amer. Midl. Nat. 39(3): 761. 1948. (Moderate policy: *R. Bongardii* Greene.)

Obviously, even under a very liberal policy some varieties could not be interpreted as species. In some cases new nomenclatorial combinations would be needed, and these are indicated.

Below the rank of species only one category is recognized. The writer's

point of view has been summarized in an earlier paper (Benson, 1943), as follows:

> A category of higher rank than variety is subspecies, and lower ones are subvariety, forma, and subforma. Many Old World and some New World botanists feel capable of distinguishing some or all of these ranks. This leads to such names as *Saxifraga Aizoon* var. *typica* subvar. *brevifolia* forma *multicaulis* subforma *surculosa* with an author's name or two inserted after each plant epithet in the chain, although it is possible to omit all the subspecific names but the last. However, it is common practice to use only a single subspecific category, usually variety, or with some individual subspecies. Definitions of the two categories vary greatly, and frequently what a particular person calls one is exactly what another botanist calls the other. Variety is the classical category below the rank of species, and it requires less formal changing of names than subspecies in all but the few groups studied intensively by recent authors favoring subspecies over variety. For example, among the seventy-nine species of North American *Ranunculi* north of Mexico (Benson, 1940 b, 1941-2, 1942) [96 in all North America] there are, in addition to the numerous typical varieties, sixty-three [78 in all North America] populations of lower rank than species. Only one [now four or five] has been named as a subspecies while all have been named as varieties. On the other hand, there is some danger of confusion of botanical varieties with horticultural varieties which are mere minor variants of commercial or aesthetic significance. Strictly speaking, however, the botanical term is *varietas*, and with this there should be no confusion. The question is far too complicated for a complete discussion here, and within the past few years taxonomists have argued it freely. . . . To some, subspecies appears to be a shiny new idea represented by a much needed new term. To others, subspecies seems to be a shiny new term for an old idea. Probably the truth is somewhere between these points of view.

The standard adopted here for acceptance of varieties is a high one, and this category is actually higher than many of the "subspecies" recognized by American botanists using this category. No entity based upon a single diagnostic character is given a formal rank, but well-marked plants of this type are discussed in the text. It is obvious that, according to moderate or liberal interpretations, these plants would be accorded varietal status, as would some with two to several distinguishing features too variable to allow formal recognition according to conservative interpretation.

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Ranunculus L.

Ranunculus L. Sp. Pl. 548. 1753.
Ficaria Huds. Fl. Angl. ed. 1. 213. 1762
Hecatonia Lour. Fl. Cocinch. 1: 370. 1790.
Ceratocephalus Moench, Meth. 218. 1794.
Batrachium S. F. Gray, Nat. Arr. Brit. Pl. 2: 720. 1821.
Oxgraphis Bunge, Verz. Suppl. Alt. 46. 1836.
Cyrtorhyncha Nutt. ex Torr. & Gray, Fl. N. Amer. 1: 26. 1838.
Flammula Fourr. Ann. Soc. Linn. Lyon II. 16: 324. 1868.
Coptidium Beurl. in Gand. Fl. Eur. 234. 1883.
Kumlienia Greene, Bull. Calif. Acad. 1: 337. 1886.
Arcteranthis Greene, Pittonia 3: 190. 1897.
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Halerpestes Greene, Pittonia 4: 207. 1900.

Glabrous or hairy annual or perennial herbs with fibrous, fascicled roots. Stems erect or procumbent, in some species rooting adventitiously at the nodes, 0.5-12 dm. long, branching or simple, fistulous or obscurely so. Basal leaves entire or 3-lobed, -parted, or -divided, or pinnately compound, the petioles dilated at the bases; cauline leaves alternate or rarely opposite. Flowers from terminal buds. Sepals 5, rarely 3, 4, or 6, deciduous or rarely persistent in fruit, 2-20 mm. long. Petals yellow or sometimes white or rarely red, often fading to white in age, 5 or rarely 0-26, 2-35 mm. long, having a usually short claw, provided at the base of the blade with a nectariferous pit covered by a scale, this rarely obsolete, the blade not lobed, rarely retuse or emarginate. Stamens 10 to many, very rarely fewer. Pistils 5 to many, the single ovule attached near the base of the cell. Achenes spicate or capitate; turgid or flattened; smooth, papillate, echinate, striate, or with transverse ridges on the faces; glabrous or hairy; tipped with a usually elongated beak (rarely obsolete); coat firm and strong, or sometimes thin and loose, rarely utricular. (Diminutive of *Rana*, Latin for a frog. Applied by Pliny perhaps because a majority of the species have a marsh or meadowland habitat common also to frogs.)

Species about 250, in nearly all frigid and temperate regions and in the mountains in the tropics. Standard species, *Ranunculus acris* L., cf. Int. Rules Bot. Nom. 142. 1935.

KEY TO THE SUBGENERA

1. Sepals 5 or rarely 6, except in *R. alveolatus* and *R. flagelliformis* (*Euranuculus* sect. *Flammula*) which have simple, entire leaves and petals only 2-2.5 mm long; achenes not constricted; cotyledons 2.

2. Achenes or utricles not transversely ridged, except in *R. sceleratus* (*Euranunculus* sect. *Hecatonia*) which has 40 or commonly 100-300 minute beakless achenes in an elongated head; petals usually glossy, yellow or rarely red, white, or green.

3. Sepals deciduous during or soon after anthesis; fruits 1-chambered.

4. Pericarp not striate or nerved, thick and firm .....Subgenus I. *Euranunculus*.

4. Pericarp striate, the nerves 3 or more on each face, these sometimes branched, the ovary wall thin and usually fragile at fruiting time ..... Subgenus II. *Cyrtorhyncha*.

3. Sepals persistent in fruit; fruits either utricular or 3-chambered.

4. Annual hypocotyl simulating a tap-root; fruit with one basal seed chamber and two lateral empty vesicles, the beak lanceolate ..... Subgenus III. *Ceratocephalus*.

4. Perennial; hypocotyl not simulating a tap-root; fruit 1-chambered, utricular, the beak not lanceolate.

5. Pericarp plane, except for one longitudinal ribbed angle on each face; sepals thick, not marcescent in fruit; petals yellow; leaves simple, entire ..... Subgenus IV. *Oxygraphis*.

5. Pericarp smooth or sometimes with the lateral and distal portions reticulate; sepals thin, marcescent in fruit; petals red or rarely white; leaves compound, dissected into ligulate leaflets or sometimes simple and deeply parted or divided ..... Subgenus V. *Crymodes*.

2. Achenes roughly transversely ridged; petals not glossy, white, the claws sometimes yellow; aquatic ..... Subgenus VI. *Batrachium*.

1. Sepals 3 or sometimes 4 (note *R. alveolatus* and *R. flagelliformis*, as indicated above).

2. Cotyledons 2; achene constricted at the middle; style present, the achene beaked; flowering stems arising from the rhizomes, the roots not tuberous.

3. Portion of the achene distal to the constriction not filled with spongy parenchyma; receptacle greatly enlarged in fruit, depressed-globose; petals perhaps white, 5 or commonly 7-10; rhizomes and scapes markedly fistulous, 2-6 mm. in diameter; leaf-blades entire or 3-lobed or -parted; subaquatic ..... Subgenus VII. *Pallasiantha*.

3. Portion of the achene distal to the constriction occupied by parenchymatous tissue; receptacle not much enlarged in fruit, subglobose; petals yellow, 5-6; rhizomes and scapes wiry, not fistulous, about 2 mm. in diameter; leaf blades 3-parted and often again lobed or parted; terrestrial or subpalustrine ..... Subgenus VIII. *Coptidium*.

2. Cotyledon apparently 1, the other enclosed by it and undeveloped; achene not constricted, not containing spongy parenchyma; style wanting, achene beakless; flowering stems from a fascicle of tuberous roots, each of which produces an independent plant the following year; petals yellow ..... Subgenus IX. *Ficaria*.

Subgenus I. EURANUNCULUS (Gren. & Godr.) A. Gray.

Euranunculus, as section, Gren. & Godr. Fl. France 1: 29. 1848.
Euranunculus, as subgenus, A. Gray, Proc. Amer. Acad. 21: 366. 1886.

Terrestrial, palustrine, or aquatic annuals or perennials. Stems branching or sometimes simple, sometimes scapose and arising from a caudex. Basal leaves simple and entire or lobed, parted, or divided, or compound. Sepals 5 (rarely 6), green or greenish-yellow, not petaloid and usually smaller than the petals, deciduous. Petals 5, rarely 1-3 or 6-26, yellow or in two species (*Ranunculus orthorhynchus* and *R. pacificus*) often red dorsally, in a European species white; nectary scales various. Achenes 5-300, flattened or turgid, not constricted; pericarp firm and strong, close-fitting, smooth, papillate, or echinate,

glabrous or hairy; beak usually present, slender. Fruiting receptacle slightly or greatly enlarged, pyriform, cylindrical, or globose.

Type species, *Ranunculus acris* L.

KEY TO THE SECTIONS

1. Leaves (either the cauline or the basal) lobed, parted, or divided (very rarely all the leaves entire in single plants of *R. glaberrimus* var. *ellipticus*).
   2. Achenes smooth, sometimes hairy (rarely papillate in some Mexican and Central American species).
      3. Style and achene beak present, the achene neither corky-keeled nor with corky thickening on the margin of the body; nectary scale ventral to the nectary, covering it, apically truncate or rounded, or the margins prolonged in *Ranunculus Eastwoodianus*, Section *Epirotes* (a species restricted to Alaska and the Yukon).
         4. Nectary scale free laterally for at least two-thirds its length, not forming a pocket (except in *R. recurvatus* var. *typicus*); dorsoventral measurement of the achene 3-15 times the lateral; receptacle in fruit (in most species) 1-3 times its length in anthesis; sepals usually not lavender- or purple-tinged, but sometimes markedly so ..... Section 1. *Chrysanthe.*
         4. Nectary scale attached to the petal laterally and forming a pocket; dorsoventral measurement of the achene 1-2.5 times the lateral; receptacle in fruit (in most species) 3-15 times its length in anthesis; sepals usually tinged dorsally with purple or lavender ..... Section 3. *Epirotes.*
      3. Style and achene beak practically lacking, if otherwise, the achene with a corky thickening on the margin of the body; nectary scale either with the gland in a pocket on its ventral surface or else the scale forked and prolonged anteriorly on the surface of the petal or surrounding the gland; aquatic or palustrine ..... Section 5. *Hecatonica.*
   2. Achenes covered with spines, hooks, or papillae or with papillae produced into hooked hairs, rarely smooth in *R. Sardous;* dorsoventral measurement of the achene 3-6 times the lateral; receptacle in fruit 1-3 times its length in anthesis. ..... Section 2. *Echinella.*
1. Leaves (*both* cauline and basal) entire, dentate, serrulate, or wavy; dorsoventral measurement of the achene not more than twice or thrice the lateral; nectary scale forming a pocket ..... Section 4. *Flammula.*

Sect. 1. CHRYSANTHE (Spach) L. Benson.

Chrysanthe, as subgenus, Spach, Hist. Nat. Veg. 7: 212. 1839.
Chrysanthe, as section, L. Benson, Amer. Jour. Bot. 23: 27. 1936.

Hairy or glabrous terrestrial annuals or perennials. Basal leaves lobed, parted, or divided, but not filiform-dissected; the cauline similar or reduced. Sepals, 5 or rarely 6, green or yellow, rarely with any tinge of red, lavender or purple. Petals 1-26 but usually 5, glossy, yellow or in two species often red dorsally; the nectary scale glabrous, not forming a pocket and free laterally at least two-thirds its length (except in *R. recurvatus* var. *typicus*), truncate or rounded apically, entire. Achenes 10-40 in a capitate cluster or cylindrioid head, discoid, the dorsoventral measurement of each 3-15 times the lateral (only 2.5 times in *R. recurvatus*); the pericarp smooth or rarely (in Mexican

and Central American species) papillate, sometimes covered with hairs; styles present, the achenes beaked. Receptacle little or greatly enlarged in fruit.

Type species, *Ranunculus acris* L.

KEY TO THE SPECIES

1. Achene beaks regularly recurved or curved or clearly falcate or hooked at the apices, 2 mm. or less long, usually shorter than the bodies or sometimes equalling them (the beak straight in *R. pacificus* and sometimes in *R. Macounii*, but then only half as long as the body.
2. Receptacle in fruit not more than 2.5 times its length in anthesis; head of the achenes hemispheroidal or globose.
3. Petals, when fully expanded,* usually 8-18 mm. long, large and conspicuous, about 1.5-3 times as long as the sepals (the petals only 6-8 mm. long in *R. occidentalis* var. *ultramontanus* and rarely in other plants included here).
4. Sepals spreading. (The *Ranunculus acris* group, except for *R. acriformis*.)
5. Stems rooting at the nodes, some of them usually stoloniferous (specimens reflecting poor field observation sometimes not showing adventitious roots even at the lower nodes); receptacle usually hispid. (Introduced in mostly northern Temperate areas.) .....1. *R. repens.*
5. Stems never rooting; receptacle glabrous.
6. Stem base forming a bulbous thickening 6-7 mm. long and 10-13 mm. in diameter; basal leaves pinnate, ovate in outline, with 3 leaflets. (Introduced in mostly northern and eastern Temperate areas.) ....2. *R. bulbosus.*
6. Stem base not with bulbous thickening; basal leaves variously parted or divided but simple, not ovate in outline.
7. Achene beaks 0.3-0.6 mm. long. (Introduced in northern Temperate and Arctic areas.) .....3. *R. acris.*
7. Achene beaks 1-2 mm. long.
8. Sepals 8-10 mm. long; basal leaf blades 3-parted and again merely lobed to cleft; achene beaks about 2 mm. long; plant sparsely hirsute; petals 10-15 mm. long, the nectary scales minute, ovate-deltoid. (Western Arctic.) .....4. *R. Turneri.*
8. Sepals 4-6 mm. long; basal leaf blades divided or deeply parted and again deeply cleft to divided one or two times; achene beaks about 1-1.5 mm. long; plant markedly to densely hirsute; petals (of var. *typicus*, the only one with spreading sepals) 7-9 mm. long, the nectary scales large, rectangular. (Montana to Utah and Colorado.) .....5. *R. acriformis.*
4. Sepals reflexed as soon as the flower is fully open.
5. Receptacle glabrous; basal leaves not prominently 3-nerved, not obovate with 3-7 apical lobes, twice- or several-times-lobed to -divided. (The *Ranunculus occidentalis* group, a difficult group of closely-related species, cf. table 2 on page 40.)
6. Achene body 1.5-3 or rarely 3.5 mm. long.
7. Sepals 5; petals not emarginate.
8. Petals 5-6 or rarely 7-9, the blades 1-2 or rarely 2.5 times as long as broad.
9. Achenes 15 or mostly 20-40; base of the achene beak conspicuously flattened, measuring 0.6-0.7 mm. dorsoventrally;

* Cf. data concerning elongation of petals during anthesis, discussed under *R. macranthus*, pages 104-5.

basal leaf blades ternately divided and again ternately divided or parted into linear divisions, sometimes with tertiary clefts, never pinnate, the ultimate divisions or parts elongated, linear to linear-lanceolate; sepals spreading in var. *typicus*, reflexed in other varieties. (Montana to Utah and northern Colorado.) ..... 5. *R. acriformis*

9. Achenes 8-15 (or perhaps rarely a few more); base of the achene beak only moderately flattened, measuring 0.3-0.5 mm. dorsoventrally, except in specimens collected near the range of *R. canus;* basal leaf blades 3-lobed, -parted, or -divided and again lobed or cleft (or sometimes pinnate with three leaflets), the ultimate lobes not elongate, either deltoid, ovate, or broadly lanceolate; sepals reflexed. (Alaska to California and the western edge of Nevada.) ..... 6. *R. occidentalis.*

8. Petals 8-16 or 26, rarely fewer, the blades 2 or commonly 2.5-3 times as long as broad. (Oregon on coastal bluffs; California to northern Baja California.) ..... 8. *R. californicus.*

7. Sepals 6 or rarely 5; petals 8-12, emarginate, 1-2 times as long as broad. (Queen Charlotte Islands, British Columbia.) ..... 7. *R. hexasepalus*

6. Achene body 3.5 or usually 4-5 mm. long, the base of the achene beak broad and thin, measuring 0.6-1 mm. dorsoventrally; petal blades 1-2 or in one variety 2-2.5 times as long as broad. (Great Valley and southern mountains, California.) ..... 9. *R. canus.*

5. Receptacle hispid; basal leaves prominently 3-nerved, obovate in outline, with 3 or as many as 7 apical divergent lobes. (The *Ranunculus domingensis* group.) ..... 10. *R. domingensis.*

3. Petals minute, 2-4 or rarely 6-7 mm. long, shorter than or slightly exceeding the sepals. (The *Ranunculus recurvatus* group.)

4. Receptacle glabrous; nectary scale not forming a pocket, free laterally its entire length. (Western North America; Mexico.) ..... 11. *R. uncinatus.*

4. Receptacle hispid; nectary scale (except in var. *tropicus*, West Indies) forming a pocket at least basally, the distal margin sometimes proliferating into a flap with free margins. (Eastern North America; West Indies.) ..... 12. *R. recurvatus.*

2. Receptacle in fruit at least 3 times its length in anthesis, hispid; head of achenes ovoid to cylindroid. (The *Ranunculus pensylvanicus* group.)

3. Sepals about twice as long as the petals; petals 2-3 mm. long; head of achenes cylindroid, 11-17 mm. long; stems never rooting. (Eastern Asia, temperate North America.) ..... 13. *R. pensylvanicus.*

3. Sepals equal to or somewhat shorter than the petals; petals 3 or 5-10 mm. long; head of achenes ovoid, 7-12 mm. long.

4. Achene body about 3 mm. long, the beak about 1 mm. long, usually curved or bent; petals 3 or 5-7 mm. long; stems rooting at the nodes when conditions are favorable. (Alaska to Labrador, California, New Mexico, and Michigan.) ..... 14. *R. Macounii.*

4. Achene body about 4 mm. long, the beak about 2 mm. long, straight; petals 7-10 mm. long; stems not rooting. (Southeastern Alaska.) ..... 15. *R. pacificus.*

1. Achene beaks not regularly curved or recurved or markedly hooked (if hooked at all, for only about 0.1 mm.), essentially straight (or sometimes bent in pressing), 1.5 or usually 2-4 mm. long, practically always equalling or exceeding the bodies. (The *Ranunculus septentrionalis* group, except *R. occidentalis.*)

2. Achene beak from subfiliform to slender, tapering only at the base; stems not truly scapose, branching, sometimes with only reduced leaves above the basal portions, the length of the mature stem always greatly exceeding that of the basal leaves; leaves with the lobes acute or obtuse, rarely broadly rounded.

3. Achenes 10-30 or 35; sepals 6-8 mm. long; petals 5 or in some species more.

4. Stems rooting at the nodes when the plants are in moist ground (as normally they are), the plants usually stoloniferous.

5. Achenes not broadly winged, the marginal keels 0.1-0.2 mm. broad or practically lacking; carpels about 15-30 or 35; plants hirsute to hispid.

6. Fruiting receptacles 4-8.5 mm. long; stamens about 40-70; sepals spreading; achenes smooth, glabrous; petals 5. (Eastern North America.) ..... 16. *R. septentrionalis.*

6. Fruiting receptacle 3-4 mm. long; stamens 25-40; sepals reflexed; achenes either smooth and glabrous or papillate or papillate-hispid; petals 5 or up to 13. (Mexico at middle altitudes.) ..... 19. *R. petiolaris.*

5. Achenes broadly wing-keeled, the wings up to 1 mm. broad; carpels about 5-10; plants subglabrous. (Eastern Kansas to Maryland and southward.) ..... 17. *R. carolinianus.*

4. Stems never rooting.

5. Sepals reflexed.

6. Roots a little thickened at the bases, forming elongated storage organs; upper portions of the stems tending to be without foliage, the leaves concentrated at the base of the plant; achene about 2.5 mm. long, smooth, the margin inconspicuous, the beak about 2 mm. long. (High mountain peaks; south-central Mexico to Guatemala.) ..... 20. *R. geoides.*

6. Roots not forming thickened storage organs; stems with the cauline leaves well distributed; achene 2.5-3.5 mm. long.

7. Achenes papillate (the faces with a few rough projections), the beaks 1.5-2 or 2.7 mm. long. (Middle altitudes; East central Mexico to Guatemala.) ..... 21. *R. pilosus.*

7. Achenes smooth, the beaks 2 or 2.5-3.5 mm. long.

8. Achenes not bevelled or keeled on the margins; basal leaves simple, 3-lobed to -divided. (Southern and eastern Oregon and adjacent California.) ..... 6 *E. & F. R. occidentalis* vars.

8. Achenes bevelled and slightly keeled on the margins; basal leaves pinnate with 3-7 leaflets (Alaska to the western United States.) ..... 22. *R. orthorhynchus.*

5. Sepals spreading.

6. Roots all alike, not thickened as storage organs; stems 2-3.3 dm. long, 1 or mostly 1.5-3 mm. in diameter; tending to be somewhat fistulous; basal leaves cordate-ovate in outline, 4-9 cm. long, 5-11 cm. broad, usually a little broader than long and 6-8 mm. in diameter, the achene body obovate. (Eastern North America.) ..... 18. *R. hispidus.*

6. Roots of two kinds, some filiform (about 0.5 mm. in diameter) and some fleshy or tuberous and about 1-5 mm. in diameter, not fistulous; basal leaves ovate-oblong in outline, 2.5-5.5 cm. long, 2-4 cm. broad, distinctly longer than broad; achenes in a hemispheroidal head 4-5 mm. long and 6-10 mm. in diameter, the achene body obovate-orbicular, 1.5-2.5 mm. long. (Eastern North America.) ..... 23. *R. fascicularis.*

3. Achenes 35 or mostly 40-130; sepals 6 or mostly 8-10 or 12 mm. long.

4. Stems not rooting; petals 8-18; plants usually (but not always) markedly

hirsute; leaves from lobed and toothed to dissected into divisions mostly 5-10 mm. broad, the divisions rarely 3-5 mm. broad on the average. (Arizona and Texas to middle altitudes in south central Mexico.) ....24. *R. macranthus.*

4. Stems rooting at the nodes, often strongly stoloniferous; petals 5-6 or up to 9; plants usually glabrous, but sometimes hirsute; leaves always finely dissected into narrowly linear divisions 1-2 mm. broad. (Middle altitudes; Central Mexico to Guatemala.) .....25. *R. dichotomus.*

2. Achene beak stout, narrowly conical, tapering its entire length; stems scapose, unbranched, not more than 1 dm. long, scarcely exceeding the leaves; leaf blades pinnate basally, pinnatifid distally, oblong-ovate, the leaflets, lobes, and divisions all broadly rounded. (Highest mountains of south-central and southern Mexico.) .....26. *R. sibbaldioides.*

1 RANUNCULUS REPENS L.

Hirsute terrestrial or palustrine perennials; roots filiform, 0.5 mm. in diameter; stems prostrate to suberect, rooting at least at the lower nodes, commonly but not always some stoloniferous, 1-8 or 9 dm. long, 0.7-2 or 6 mm. in diameter, branching, not fistulous, hirsute to glabrous or nearly so;

TABLE 1.—Varieties of *Ranunculus repens.* L.[1]

Var. *typicus*	Var. *glabratus*	Var. *pleniflorus*
Stems and petioles hirsute, the hairs spreading or appressed.	Stems and petioles subglabrous to sparingly hirsute.	Stems and petioles as in var. *glabratus.*
Stems 1-8 dm. long; larger leaves 1.5-6 cm. broad.	Stems mostly 7-9 dm. long; leaves up to 10 or 11 cm. long, as much as 13 cm. broad; much more dissected than in the other varieties; a robust type.	As in var. *typicus,* but the plant tending to be large and rather robust, with thick stems and leaves.
Stolons well-developed, often elongate.	As in var. *typicus* or less stoloniferous.	Not as markedly stoloniferous as most forms of var. *typicus;* tending to be erect.
Middle leaflet of each basal leaf cuneate to subtruncate at the base.	As in var. *typicus.*	Middle leaflet of each basal leaf rounded to subcordate at the base.
Petals 5; stamens numerous.	As in var. *typicus.* (In an extreme form the inflorescence subcymose.)	Petals numerous, all but 5 produced by transformation of stamens, forming a "double" flower.

[1] Varieties are based upon characters less stable than those distinguishing species, and keys to varieties are apt to be misleading because they throw too great emphasis upon single or few features. It is hoped that placing the descriptions in tabular form will emphasize the complex of characters which sets off each variety. Thus, if one factor proves unreliable, the preponderance of characteristics should place the plant still in the correct category.

leaf blades compound, deltoid-cordate in outline, 1.5-6 or 11 cm. long, 2-8 or 13 cm. broad, pinnate with 3 sessile or petiolulate leaflets, these proximally cuneate to subtruncate or sometimes rounded or subcordate and distally lobed and toothed, but acute in outline, or sometimes the leaflets tending to be rounded, the middle petiolule up to 4 cm. long, the lateral up to 2 cm. long, the petioles 4-25 cm. long, hirsute to subglabrous, the stipular leaf bases 6-20 mm. long; cauline leaves alternate, like the basal; pedicels 2-10 cm. long in flower, 4-15 cm. long in fruit, pubescent; sepals 5, greenish, spreading, 5-7 mm. long, 3-4 mm. broad, pilose, two-fifths the length of the petals, promptly deciduous; petals 5 or rarely the staminodia forming a "double" flower, cuneate-obovate, 7-13 mm. long, 5-10 mm. broad, the nectary scale glabrous, free laterally for two-thirds of its length, 1-1.3 mm. long, truncate; stamens 50-80, the number reduced in "double" flowers; achenes 20-25 in a subglobose head 6-7 mm. in diameter, each achene obovoid-discoid, 2.5 mm. long, 2 mm. dorsoventrally, 0.7 mm. laterally, smooth, glabrous, the margin prominent, the beak stout, 1 mm. long, recurved; receptacle subglobose-ovoid, 1-2 mm. long in flower, 3 mm. long in fruit, pubescent or rarely glabrous.

Spring and summer.

Other varieties than those given here are poorly differentiated. Since they are native in the Old World, the writer has some caution about either reducing or recognizing them. However, they are not impressive as biological entities.

1a RANUNCULUS REPENS var. TYPICUS G. Beck.*

R. repens L. Sp. Pl. 554. 1753. *R. intermedius* Eat. Man. Bot. ed. 3. 424. 1822, neither Poir. in 1804 nor Heller in 1896. *R. Clintonii* Beck, Bot. N. & Mid. States 9. 1833.

Meadows and marsh borders at low altitudes or up to 5,300 feet elevation in the interior of the West; native of the Old World naturalized particularly in the Pacific, Sierran, Rocky Mountain, Northern, and Deciduous forests and in the mountain forests of Central America and the West Indies. Pacific Coast forest region from Alaska to the Pacific States as far south as Carmel River, California, and at scattering inland stations; occasional in Idaho, Montana, Utah, Colorado, South Dakota, Minnesota, Wisconsin, and Illinois; more or less continuous in favorable locations from Ontario to southern Labrador and southward to Michigan and West Virgina and at scattered stations thence to Ohio and North Carolina; Iceland; Costa Rica; Jamaica; Bermuda. May and June or sometimes July or August.

The species occurs in lawns, and by its prostrate habit, it cheats the mower. Except around the edges of the lawn, the plants remain compact and small.

Occurrence or even local abundance far beyond the outlined limits is not precluded, and the species may appear in moist places throughout the temperate areas of the world. It spreads rapidly from lawns into meadows and to

* Cf. Table 1.

stream borders, and probably it is carried in hay and other seed-containing materials or with crop seeds. Consequently, the distribution is not static, and it is difficult to map.

Significant specimens.—ALASKA: St. Lawrence Island, Bering Sea, *Mason 6094, UC;* Anvik, Lower Yukon River, *Chapman 8* in 1924, *GH;* Kokrines, Yukon River, *A. E. & R. T. Porsild 624* in 1926, *GH, Can;* Olga Bay, Kodiak Island, *E. & H. Looff 1048, RM;* Alitak, Kodiak Island, *Looff 129* in 1937, *GH;* common in southeastern Alaska.

BRITISH COLUMBIA: Prince Rupert, *Laing 514* in 1924, *Can;* Spence's Bridge, *Macoun* in 1889, *Can;* Ducks, Shuswap Lake, *McEvoy* in 1894, *Can.*

LABRADOR: Square Island Harbor, *Bowdoin College Collection 277* in 1891, *GH, 278* in 1891, *GH;* Cartwright, *Hitchcock 23778* in 1928, *US.*

ICELAND: Taylor in 1895, *DS;* Laxardal, *Palsson 188* in 1929, *RM.*

WASHINGTON: Confluence of Colville and Columbia rivers, *Rogers 634, Pom-B, Utah, GH, Mo, 694, CAS, Clo, Boner & Weldert 177, DS, Utah, RM, Sharsmith 4036 WSC, DS, UC, Wash.*

CALIFORNIA: LAKE CO. Cobb Valley, *L. Benson 3696, Pom-B, DS, UC, RM.* MONTEREY CO. Carmel River, *Patterson & Wiltz* in 1907, *DS, UC, Pom-B.* SHASTA CO. North Fork of Castle Creek, Mt. Shasta Region, *L. E. Smith* in 1913, *NR.* MODOC CO. Goose Lake, *Austin & Bruce 98, UC, 407* in 1895, *Pom, UC,* in 1898, *DS, Bruce* in 1899, *DS, Austin* in 1895, *HGr.* PLUMAS CO. Quincy, *Keck 1678, DS, CAS, UC, Peirson, Pom.* NEVADA CO. Bear Valley, *Eastwood 203* in 1898, *US.* FRESNO CO. Pine Ridge, *Hall & Chandler 154* in 1900, *DS, UC, US.* LOS ANGELES CO. Alhambra, *Mrs. J. D. Abrams* in 1917, *DS* (probably in a lawn).

IDAHO: CUSTER CO. Challis, *Macbride & Payson 3344, NY, DS, CAS, Pom, UC, RM, GH, Mo, US.* KOOTENAI CO. Coeur d'Alene, *Rust 460* in 1914, *US.*

MONTANA: MISSOULA CO. Missoula, *Kirkwood 2519, GH, PA.*

UTAH: DAVIS CO. *Garrett 8071, Pom-B.* SALT LAKE CO. Salt Lake City, *Garrett* in 1909, *NY* (possibly var. *glabratus*), *Clements* in 1908, *DS.* UTAH CO. Provo, *Harrison & Williams 6073, Utah, Mo.* RICH CO. Goodman Ranch, Bear River Valley, *Hermann 5777, Mo* (remarkably short petals and a possible tendency for the sepals to be reflexed; flowers and fruits somewhat like *R. Macounii,* but apparently definitely *R. repens*). GARFIELD CO. (?) Cow Puncher Creek, Aquarius Plateau, Powell Nat. For., *Maguire 19169* in 1940, *Utah, Wash, WSC, GH, 19180, Utah, Pom-B.*

COLORADO: ARAPAHOE CO. Denver, *Clokey 4113, NY, DS, CAS, UC, Clo, Utah, RM, Wash, Pom, Mo, US, WSC, Bethel 7* in 1916, RM.

SOUTH DAKOTA: BROOKINGS CO. Brookings, T. A. Williams in 1891, *Mo.*

MINNESOTA: ST. LOUIS CO. Duluth, *Lakela 2819,* GH.

WISCONSIN: DOOR CO. Sturgeon Bay, *J. J. Davis* in 1929, *GH.*

MISSOURI: St. Louis, *Steyermark 10398, Clo.*

ILLINOIS: RICHLAND CO. Olney, *Ridgway 810* in 1919, *GH.* COOKE CO. West Chicago, *Umbach* in 1897, *GH.*

OHIO: PORTAGE CO. Garrettsville, *Webb 1043* in 1908, *GH.*

NORTH CAROLINA: ASHE CO. *Ashe, NY.*

COSTA RICA: Common at 5,000 to 9,000 feet elevation in the central cordillera.

PANAMA: Bajo Chorro, Chiriqui Prov., *M. E. Davidson 444, Mo, F, Woodson & Schery 646, GH.*

JAMAICA: Hardware Gap, vicinity of Newcastle, *Britton 3318, NY;* vicinity of Cinchona, *A. Taylor 4223, F, NY.*

BERMUDA: Pembroke Marsh, *Brown & Britton 336* in 1905, *F, PA, US, NY.*

Type collections.—(1) *R. repens,* "*Habitat in* Europae *cultis.*" (2) *R. intermedius,* "Found on the banks of the Hudson near Albany, by Mr. J. G. Tracy." (3) *R. Clintonii,* Hab. "Banks of the canal near Rome, Oneida Co., N. Y."

For many years in the Nineteenth Century *Ranunculus septentrionalis* Poir., a species with elongated straight achene beaks, was supposed by American botanists to be *R. repens* L., and the older specimens in the *R. repens* folders of many herbaria include sheets of *R. septentrionalis*. There is corresponding confusion in the older literature.

1b RANUNCULUS REPENS var. GLABRATUS DC.* Prodr. 1: 38. 1824

Wet meadows and borders of marshes; native of the Old World naturalized here and there especially in the northern United States and northward; Pacific, Northern, and Rocky Mountain forests. Scatttering stations from Alaska to Oregon and Colorado and from Ontario to Labrador and New Jersey.

Specimens examined.—ALASKA: Bering Island, Gribiutsky in 1891, *Geol. Surv. Can. 18936, Can;* Sidden's Valley, Attu Island, *Hardy 324* in 1945, *Pom-B;* Attu Village, Chicagof Harbor, Attu Island, *Van Schaack 595, Pom-B;* Olga Bay, Kodiak Island, *E. & H. Looff 477* in 1938, *Pom-B;* Lake Allakuagik, *McKay* in 1881, *US;* Mushgak River 40 miles above Mushgak, *McKay*, June 26, 1881, *US 126372* (this and the preceding specimen being a peculiar type with the following characters: glabrous; stems 3-5 mm. in diameter; petals 9-10 mm. long, the flowers remarkably small; sepals possibly sometimes reflexed; similar specimens from Siberia as follows: Jeniseisk, *Marks* in 1876. *US;* Commander Islands, *Stejneger 46* in 1883, US); Coastal Areas, Southeastern Alaska, *Mr. & Mrs. E. P. Walker 1103, RM;* Wrangell, *Mr. & Mrs. E. P. Walker 618, US;* Ketchikan, *A. & R. Nelson 3461, US.*

BRITISH COLUMBIA: Lower Alloknagik Lake, ..., July 16, 1882, *US 1224* (the same as the peculiar Alaskan type collected by McKay, cf. above): Nanaimo, *Macoun* in 1908, *Geol. Surv. Can 77384a, Can.*

ONTARIO: Seaforth, *W. Scott 1* in 1904, *Can.*

QUEBEC: Rupert House (51° 30′ N) *Dutilly & Lepage 13586, Pom-B;* Contrecoeur, Vercheres Co., *Victorin & Germain 34234* in 1930, *CAS, GH;* Rivière du Loup, *Victorin 57* in 1913, *GH;* Little Metis, *Fowler* in 1906, *GH;* Jct. Restigouche and Matapédia rivers, *Rousseau & Bonin* in 1929 (*32056*), *Can;* Gaspé Basin, *Fowler* in 1905, *US;* Carleton, *Collins, Fernald, & Pease* in 1904, *GH;* Ellis Bay, Anticosti, *Victorin & Germain 27173, CAS, US, Pom, WSC.*

LABRADOR: Cartwright (53° 42′ N; 56° 58′ W), *Malte* in 1928, *Can.*

NEWFOUNDLAND: Topsail, Conception Bay, *Howe & Lang 1205, GH;* Force le Plain, Harry's Brook, *R. B. Kennedy 336, GH.*

NEW BRUNSWICK: Shediac Cape (Point), *Hubbard* in 1914, *US.*

PRINCE EDWARD ISLAND: St. Peter's Bay, *Fernald & St. John 11062, Can, WSC.*

WASHINGTON: GRAY'S HARBOR CO. Montesano, *L. Benson 1434, Pom-B, DS.* KITSAP CO. Retsil, *De Neff 583, WSC.* KING CO. Three Tree Point, *L. Benson 1334, Pom-B, DS, Wash.*

OREGON: CLATSOP CO. Sauvies Island, *J. W. Thompson 4235, PA, Wash.* COLUMBIA CO. Clatskanie, *J. W. Thompson 2408, DS, Wash, PA.* WASHINGTON CO. Scroggins Creek, *J. W. Thompson 4294, DS, PA, US, Wash.* MULTNOMAH CO. *Sheldon 10452, US* (this specimen recorded but not supported by the duplicate, *Pom*). CURRY CO. Cape Blanco, *Abrams & C. T. Benson 10628, DS.*

IDAHO: Payette Forest Reserve, *Mains 283* in 1912, *RM.*

NEVADA: ELKO CO. Kleckner Creek, Ruby (East Humboldt) Mts., *Train* in 1936. *USNA.*

UTAH: DAVIS CO. Farmington, *M. E. Jones 2136* in 1881, *Pom, Clemens* in 1908,

* Cf. Table 1.

DS, GH, photograph *Pom-B.* UTAH CO. Provo, *Eastwood & Howell 559, DS, 559a, CAS.*

MONTANA: MISSOULA CO. Lolo Divide, *F. H. Rose 493, WSC.* Bitterroot River at Missoula, *Kirkwood 2519, CAS, RM.*

COLORADO: EL PASO CO. Cheyenne Creek, *Christ 2016, USNA.*

NEW YORK: Williams Bridge, *Hulse* in 1891, *Ill.*

MASSACHUSETTS: Wellesley, *Gilbert* in 1894, *GH;* St. ....., *Botanic Garden of Harvard University* in 1862, *GH;* Nantucket, *Day 4* in 1900, *GH.*

NEW JERSEY: Durham, *Pollard* in 1894, *US;* Closter, ... in 1861, *GH.*

The extreme form is so striking and it differs so markedly from var. *typicus* as to seem to be a ... ier species, but intermediates are so abundant that a clear distinction from var. *typicus* sometimes is difficult.

Type collection.—None given, European.

Ranunculus repens L. var. *erectus* DC. Prodr. 1: 38. 1834 is said to differ in its tendency not to be stoloniferous and in somewhat thicker leaves and stems. Apparently the best specimens of this plant are the collections from Washington cited above (*L. Benson 1334 and 1434*) and one of those from Attu Island (*Van Schaack 595*), but intergradation is complete, and segregation is so unsatisfactory that it seems best to recognize only one large glabrous, robust, erect variety for North America, pending further study of European material. Vars. *glabratus and erectus* seem to be essentially synonymous.

1c RANUNCULUS REPENS L. var. PLENIFORUS Fern.* Rhodora 19: 138. 1917

A garden form of obscure origin; occasional as an escape occurring in moist ground. Here and there in New York, New England, and Maryland and probably elsewhere in the northeastern United States, adjacent Canada, and in at least Alaska, Washington, and Idaho.

Specimens examined.—ALASKA: Craig, *Looff & Looff 777, Pom-B.*

WASHINGTON: KITTITAS CO. Liberty, *J. W. Thompson 11617, Pom-B, DS, Wash, GH, Mo, US.*

OREGON: BENTON CO. Mary's Peak, Owens in 1915 (one multipetalous flower), *OSC.* HOOD RIVER CO. Odell, *Suksdorf 2124, WSC.*

CALIFORNIA: HUMBOLDT CO. Carlotta, *J. P. Tracy 15740. UC.*

IDAHO: BANNOCK CO. South of Oxford, *R. J. Davis* in 1934, *ISB, RM.*

UTAH: CACHE CO. Logan, *Maguire 2316, Utah, Cronquist 1024, Mo;* Providence, *Surface 31* in 1937, *USNA.* UTAH CO. Springville, *Harrison 64H* in 1929, *UC, Utah.*

NEW YORK: CHEMUNG CO. Pine Valley, *Lucy 1230, RM.* TOMPKINS CO. Danby, *Eames & MacDaniels 437, GH.* MADISON CO. Oneida, "Herkimer Co.," *Harberer 1530, GH* (type). HERKIMER CO. Frankfort, *Harberer 1530, US* (number not recorded; probably an isotype), the type locality being probably Frankfort instead of Oneida ascribed below to the wrong county.

VERMONT: CHITTENDEN CO. Underhill, *Flynn* in 1911, *GH.* RUTLAND CO. East Wallingford, *Kent* in 1909, *GH.*

MASSACHUSETTS: Mt. Greylock, to Williamstown, *Burnham* in 1910, *GH.*

CONNECTICUT: Mt. *Riga*, Salisbury, *Bissell* in 1903, *GH;* Canaan, *Harger 7066, Clo.*

* Cf. Table 1.

MARYLAND: Baltimore, *Churchill* in 1910, *GH.*
NORTH CAROLINA: Forsyth, *Schallert* in 1941, *Clo.*

Type collection.—"Frequent in old gardens, and tending to become naturalized in meadows and along roadsides, Oneida, Herkimer County, New York, May 30, 1900, J. V. Haberer no. 1530 in Gray Herb." Probably Frankfort instead of Oneida, which is in Madison County, cf. above.

According to Fernald, *loc. cit.* "This plant is generally called in horticulture *R. repens*, var. *florepleno* but the latter name (if it can be accepted as a valid name) belongs to the double-flowered European form of *R. repens* with the bases of the leaflets cuneate to subtruncate, as in true *R. repens*, and the teeth and segments elongate and subacute to acuminate. The history of var. *pleniflorus* is obscure. It is found in old gardens and as a somewhat naturalized weed in eastern America; but such illustrations of the double-flowered *R. repens* of Europe as the writer has seen, as far back as Gerard's Herball (ed. Johnson, 1633), where the plant is figured as *Ranunculus dulcis, multiplex*, and Besler's Hortus Eystettensis (1613) where it is called *Ranunculus hortensis, multiflorus*, show the characteristically cuneate-based leaflets of *R. repens*."

2. RANUNCULUS BULBOSUS L. Sp. Pl. 554. 1753

R. tuberosus Hornem. Hort. Hafn. 2: 527. 1815. *R. Hornemannii* Schlect. Animad. Ranunc. 2: 36. 1820. *Ranunculus bulbosus* var. *petiolulatus* Krause, Beih. Bot. Cent. 32(2): 330. 1914.

Hirsute terrestrial perennials; roots mostly 1.5 mm. in diameter; stems stout, each with a basal tuberous portion 6-7 mm. long and 10-13 mm. in diameter, erect, not rooting, 3-7 dm. long, 1-3 mm. in diameter, freely branching, only slightly fistulous, rather densely hirsute, the hairs usually appressed; basal leaf blades compound, ovate in outline, 1.5-2.5 cm. long, 1.5-3 cm. broad, pinnate with the 3 leaflets basally cuneate to nearly truncate and distally lobed and toothed but rounded in outline, the leaf proximally cordate, appressed-pubescent, petioles 5-14 cm. long, appressed-hirsute, stipular leaf bases 1-1.5 cm. long, deltoid; cauline leaves alternate, the bracts divided and lobed, sessile; pedicels 2-4 or 10 cm. long in flower, 3-9 or 12 cm. long in fruit, appressed-hirsute; sepals 5, greenish-yellow, reflexed at the middles, ovate-acute, 7 mm. long, 3.5-5 mm. broad, pilose dorsally, the margins scarious, often purple-tinged, two-thirds the length of the petals, promptly deciduous; petals 5, orbicular-obovate, 10-14 mm. long, 7-10 mm. broad, the nectary scale glabrous, free for two-thirds of its length, 1 mm. long, truncate; stamens 35-60; achenes 12-30 in a globose-ovoid head 6-7 mm. long and 6-7 mm. in diameter, each achene about 2.8 mm. long, 2.3 mm. dorsoventrally, 0.6 mm. laterally, smooth, glabrous, the margin prominent, keeled, the beak stout, 0.4 mm. long, recurved, receptacle stiped, the fruiting part narrowly ovoid, over all 1-2 mm. long in flower, 4 mm. long in fruit, pubescent.

Relatively dry fields and roadsides at usually low elevations. Native of the Old World naturalized in the Northern, Pacific, Deciduous, Southeastern Pine, and Riverbottom forests. Revelstoke, British Columbia; London, Ontario; St. John's, Newfoundland; Nova Scotia; Bingen, Washington; Portland and

Salem, Oregon; Fortuna, California; sparingly from Michigan to Missouri and Tennessee; Red River, Louisiana; from New York and New England to West Virginia and Bryan County, Georgia. Largely May and June.

Significant specimens.—BRITISH COLUMBIA: Revelstoke, *Macoun* in 1890, *Geol. Surv. Can. 1036, GH, Can.*

ONTARIO: London, *Burgess* in 1878, *Can.*

NEWFOUNDLAND: St. John's, *Ayre* in 1932, *GH.*

NOVA SCOTIA: Yarmouth, *Macoun* in 1910, *Geol. Surv. Can. 80902, Can;* Shelburne, *Fernald 2552, GH;* Mahone Bay, *Hamilton* in 1899, *Geol. Surv. Can. 23069, Can.*

WASHINGTON: KLICKITAT CO. Bingen, *Suksdorf 7427, GH, WSC.*

OREGON: MULTNOMAH CO. Albina, Portland, *Suksdorf 3228, WSC;* Linnton near Portland, *Suksdorf 3061, WSC.* POLK CO. Salem, *J. C. Nelson 673, WSC, 4259, WillU, Peck 9280, WillU.*

CALIFORNIA: "An escape at Fortuna, Humboldt Co. (acc. J. P. Tracy) . . ." Jepson, Man. Fl. Pl. Calif. 389. 1925.

MISSOURI: DUNKLIN CO. Campbell, *Steyermark 26666, Clo.* BOONE CO. Columbia, *Rickett 1313, Mo.*

ILLINOIS: HENDERSON CO. Oquawka, *Patterson* in 1875, *NY.*

INDIANA: MARSHALL CO. Knapps, Lake Maxinkuckee, *Clark 1756, US, DS;* also several specimens are cited by Deam, Fl. Indiana 471. 1940.

TENNESSEE: COFFEE CO. Manchester, *Deam 61390, Pom-B.* KNOX CO. Knoxville, Ruth in 1895, *Pom, US,* in 1896, *Mo,* in 1898, *Mo, 215, NY.*

LOUISIANA: Red River, *Hale* in April, *NY.*

GEORGIA: BRYAN CO. Ways, *Moldenke 1188, NY, US, Ill, Mo.*

Type collections.—(1) *R. bulbosus,* "*Habitat in* Europae *pratis, pascuis.*" (2) *R. tuberosus,* "Hab. in Amer. bor. Planta sub dio vegetans intr. in 1809." Hafniae. Acc. Schlecht., *loc. cit.,* "Hab. in America boreali. . . . (Hornem [ann])." (3) *R. Hornemanii, nom. nov.* for *R. tuberosus.* (4) Var. *petioluluatus,* "No. 5568. In und um Norfolk häufig." "Im Mai & Juni 1890, botanisierte ich um Norfolk." Virginia, *Krause.*

3 RANUNCULUS ACRIS L.

Hirsute terrestrial perennials, the pubescence spreading or rarely appressed; roots stout but not tuberous, 0.5-1 mm. in diameter; stems several, erect, not rooting, 5-10 dm. long, 1.5-3 mm. in diameter, unbranched in the first 2-3 dm., freely branching above, slightly fistulous, glabrous or sparsely hirsute; basal leaf blades simple, (nearly always as follows) pentagonal in outline, 4-8 cm. long, 5-10 cm. broad, deeply 3-parted and again lobed, appearing 5-parted by forking of the lateral primary parts, proximally deeply cordate, distally rounded in outline, densely appressed-hirsute beneath, more sparsely so above, petioles 5-17 cm. long, hirsute, stipular leaf bases 3-5 cm. long; cauline leaves alternate, petioled, the bracts of 3 linear divisions, sessile; pedicels 1-5 cm. long in flower, 4-12 cm. long in fruit, densely pubescent; sepals 5, greenish, spreading, ovate, 4-7 mm. long, about 3 mm. broad, densely pubescent dorsally, one-third the length of the petals, promptly deciduous; petals 5, obovate-cuneate, 8-14 mm. long, 6-10 mm. broad, the nectary scale glabrous, free laterally for two-thirds of its length, 1.2 mm. long, truncate; stamens 40-80; achenes 25-40 in a globose head about 6 mm. in diameter, each achene obovoid-discoid, 2-2.5 mm. long, 1.8 mm. dorsoventrally, 0.5 mm. laterally, smooth, glabrous, the margin

conspicuous, keeled, the beak deltoid at the base, 0.3-0.6 mm. long, recurved; receptacle pyriform, 1-2 mm. long in flower, 2.5 mm. long in fruit, glabrous.

3a RANUNCULUS ACRIS L. var. TYPICUS G. Beck.

R. acris L. Sp. Pl. 554. 1753. *R. McCallai* Davis, Minn. Bot. Studies 2: 428. 1900. *R. icelandicus* Davis, loc cit. 472.

Pubescence spreading; basal leaf blades as described in general for the species above, the type in var. *frigidus* being rare and not included in the general description.

Pastures, meadows, and roadsides mostly at relatively low elevations, but occurring up to 5,500 feet elevation in the mountains of the West; native of the Old World naturalized and spreading rapidly in the Pacific and Northern forests and less rapidly into the Rocky Mountain and Deciduous forests and the Prairie. Eastern Aleutian Islands to Labrador, Greenland, and Iceland and southward to Western Washington, Alberta, Iowa, Illinois, Ohio, West Virginia, and New Jersey; occasional on southward to (northern-most) California, northern Idaho, Nevada, Utah, Wyoming, South Dakota, Kansas, Missouri, Tennessee, and Georgia. Late spring and early summer.

Significant specimens.—ALASKA: Massacre Bay, Attu, *Van Schaack 21* in 1944, *US;* Unalaska, *Eyerdam 2421, US, DS;* Kodiak, *Mylroie* in 1902, *NY;* Dutch Harbor, *J. P. Anderson 4102, ISC;* King Cove, *Eyerdam 1563, DS, US, Can;* Skagway, *J. P. Anderson 1734, ISC;* Juneau, *J. P. Anderson* in 1940, *ISC, Pom-B;* Hyder, *McCabe 8483, UC, Pom-B.* According to J. P. Anderson (letter of May 13, 1942) the species appeared at Juneau first about 1939.

LABRADOR: Gillesport, Lake Melville District, *Wetmore* in 1921, *Can.*

WASHINGTON: CLALLAM CO. Blyn, *G. N. Jones 8531, Wash* JEFFERSON CO. Quilcene, *L. Benson 1402, DS, Pom-B, Wash, Beattie 3638, WSC, Otis 1457, WSC, Wash; Dosewallops River, J. W. Thompson 6549, DS, Pom-B, Wash, Mo, PA;* "Jefferson Co.," *Gardner* in 1896, *UC;* Crocker Lake, *G. N. Jones 5919, Wash.* MASON CO. *F. G. Meyer 976, WSC;* KITSAP CO. Manchester, *B. & E. Wheeler 30* in 1932, *Pom-B;* Port Orchard, *Eyerdam 1576, WSC;* Waterman, *Warren 81* in 1923, *WSC, Wash.* WAHKIAKUM CO. Cathlamet, *Anderson* in 1918, *NR.* WHATCOM CO. Blaine to Bellingham, *L. Benson 1511, Pom-B, DS, Wash;* Goshen, *W. & M. Muenscher 5409, Wash.* SNOHOMISH CO. Skykomish River, Staircase Camp, *Meyer 976, Mo;* Marysville, *J. M. Grant* in 1929, *UC;* Silverton, *J. W. Thompson 8827, Pom-B, NY, DS, UC Wash, Mo.* KING CO. Bothel, *L. Benson 1467, Pom-B, DS, Wash, Mo, US;* Snoqualmie Pass, 4,000 feet, *J. W. Thompson 7205, DS, Pom-B, UC, Wash, Mo, PA, 9718, Pom-B, DS, UC, Wash, Mo, US, G. N. Jones 1271, GH;* Seattle, *Bardell* in 1910, *Mo.* THURSTON CO. Eatonville, *L. Benson 2359, Pom-B, NY, DS, Mo, US.* The spread of this species in Washington has been exceedingly rapid, and now the plant may be considered as common. It was not reported by Piper, Fl. N. W. Coast 256-9. 1915, and probably it was very rare at that time, for only three previous collections have come to light. Until 1929, when the writer found the species to be widespread and abundant over considerable areas, there had been only two additional collections.

OREGON: MULTNOMAH CO. Linnton near Portland, *Suksdorf 1775, WSC.* LANE CO. Florence, *Peck 18675, Mo; Salem, Peck 4618, WillU, 6421, WillU.* MARION CO. Brooks, *J. C. Nelson 4251, WillU, OSC.* UNION CO. Union, *Cusick, 3345, WSC, 4903, WSC, UO,* Piper in 1921, *WSC; Peck 17442, DS; Cove,* Grand Ronde Valley, *Cusick 4902, WSC, Mo,* probably not duplicating the Union collection.

CALIFORNIA: HUMBOLDT CO. Carlotta, *Hanver* in 1915, *CAS.*

NEVADA: ORMSBY CO. Clear Creek Grade, Carson City, *L. R. Miller 48, Clo.*

IDAHO: BONNER CO. Cocollala, *Christ 1448, Chr;* Sandpoint, *Christ 105, Chr;* Kootenai, *Christ 16559, Chr.* The earliest of these collections was made at Sandpoint in 1928.

UTAH: CACHE CO. Bear Lake Road, Blacksmith Fork Canyon, *Maguire 20379* in 1934, *WSC, Wash;* Paradise, *Garrett 8423, Pom-B, Gar, Clo.*

MONTANA: LAKE CO. 5 miles east of Polson, *Reynolds* in 1948, *Pom.* GALLATIN CO. Bozeman, *Swingle* in 1933, *Utah, RM, Wash.*

WYOMING: LINCOLN CO. Cokeville, *A. Nelson 4627, RM, Ill.*

SOUTH DAKOTA: Sylvan Lake, *McIntosh 1077 RM.*

KANSAS: POTTAWATOMIE CO. St. George, *Kellerman* in 1890, *Mo;* Manhattan, *Kellerman* in 1880, *Mo.*

MISSOURI: JACKSON CO. Sugar Creek, *Bush 3908, NY, Mo;* Lake City, *Bush 9357, Mo;* Courtney, *Bush 794, NY, Mo;* Sheffield, *Bush 654, HGr, Mo.* Lake City and Sheffield have not been located with certainty. The last two collections were stated to have been along the railroad.

TENNESSEE: Rawlinsville *Galen* in 1884, *Mo* (almost certainly *R. acris*).

MARYLAND: WORCESTER CO. *Redmond 534* in 1931, *DS, 535* in 1931, *RM.*

VIRGINIA: MADISON CO. Fisher's Gap Road above Dark Hollow, Shenandoah National Park, *E. H. Walker 2829, US.* NANSEMOND CO. *Britton & Small* in 1893, *NY.*

NORTH CAROLINA: Flat Rock, *Gibbes* in 1858, *NY.* BUNCOMBE CO. Mt. Mitchell, *Rydberg 9393, NY, CAS, UC.*

GEORGIA: CLARKE CO. Athens, *Miller & Maguire 611, Utah, 631, Utah.*

BERMUDA: South Shore Road, Devonshire, *Brown & Britton 244* in 1905, *NY, US, F, PA.*

According to M. P. Porsild, Med. Grønl. 92(1): 30. 1932. *R. acris* may be indigenous in Greenland and Iceland, since it occurs in little-visited parts of the high mountains. This may be correct, but it is to be noted, of course, that *R. acris* spreads into new territory with amazing rapidity, as has been noted above in the discussion of its occurrence in Washington. Nevertheless, the areas mentioned by Porsild may be too remote from human habitation or areas of introduction about campsites for this to have occurred.

Type collections.—(1) *R. acris*, "*Habitat* in Europae *pratis, pascuis.*" (2) *R. McCallai*, "Collected by W. A. McCalla (2113) near Banff, Alberta, Canada, July 1899, in wet meadows." Type, *Crn*, photograph *Pom-B;* isotypes, *Wash* (*J. W. Thompson Herb. 104*), photograph *Pom-B, NY, US 368343.* (3) *R. icelandicus*, "Collected in June, 1895, by Elizabeth Taylor at Seydisfjordr, Iceland." Type, *Crn*, photograph *Pom-B.* The writer is indebted to Dr. Robert T. Clausen of Cornell University for the photographs of the types of *R. McCallai* and *R. icelandicus.*

A form with less-dissected leaves with broadly oblanceolate or more-or-less cuneate segments has been known in the northeastern states and adjacent Canada as *Ranunculus acris* var. *Stevenii* (Andrz.) Lange. This form occurs in the Craigmyle District, Alberta, and here and there from Quebec to Newfoundland, Novia Scotia, New York, and New England. According to the viewpoint of the writer, this solitary character, associated with nothing else in particular, is not adequate to warrant recognition of a variety. Moreover, reference of the North American plants to var. *Stevenii* is doubtful at best. *R. Stevenii* Andrz. is described by Hegi, Ill. Fl. Mit.-Eur. 3: 563. 1906, as distinguished by the long, fleshy rhizome and by marked hirsuteness of the foliage leaves rather than by the dissection of the leaves, which are described as variable. None of the American material seen by the writer has

any tendency to produce a rhizome similar to that figured by Hegi (*f. 694*) or to be markedly hirsute, that is, much beyond the average for typical *Ranunculus acris*. True var. *Stevenii* is reported to be native in France and (disjunctly) in the Balkans and to be perhaps introduced or mostly so in Germany and Switzerland. Further study of the Old World forms is necessary.

According to Ora Parker Phelps (Rhodora 21: 208. 1919), *Ranunculus Boraeanus* Jordan, Obs. Pl. Crit. (6): 19. 1847, a plant of Central Europe, segregated by some writers from *R. acris*, was collected in 1919 at Gansevort, New York. Various authors have considered this plant as a variety of *R. acris;* Hegi, *loc. cit.* 561, places the name in synonymy. The leaves are more finely dissected.

3b RANUNCULUS ACRIS L. var. FRIGIDUS *Regel.*
Mem. Acad. Imp. Sci. St. Petersb. VII. 4(4): 7. 1861

Pubescence appressed; basal leaf blades less dissected than in var. *typicus*, deeply parted to barely divided, the lateral parts again parted or again lobed and toothed.

Meadowland. Siberia; Attu and reported from Buldir and Alaid, Aleutian Islands, by Hultén, Fl. Alaska & Yukon, Lunds Univ. Arrsk. II. 40(1): 745. 1944). As pointed out by Hultén, this variety probably is indigenous in the Aleutian Islands.

Specimens examined.—ALASKA. ALEUTIAN ISLANDS: ATTU *I.* High beach at Sarana Bay, *Hardy 124* in 1945, *Pom-B, US*, dupl. *Wash* (not seen); Sugar Loaf, Massacre Bay, *Van Schaak 466* in 1945, *Pom-B*, dupl. *US* (not seen). The plant is on Bering Island, *Gribnitsky* in 1891, *Can.*

Type collection.—"Siberia."

4 RANUNCULUS TURNERI Greene, Pittonia 2: 296. 1892

R. occidentalis Nutt. var. *Turneri* L. Benson, Bull. Torrey Club 68: 167. 1941.

Sparsely hirsute terrestrial perennials; roots 1-1.5 mm. in diameter; stems erect, not rooting, 1-5(?) dm. long, 1.5-4 mm. in diameter, branching especially above, fistulous, sparsely hirsute, the hairs spreading; basal leaf blades simple, cordate to reniform in outline, 1.3-3 cm. long, 1.8-4 cm. broad, 3-parted and again once- or twice-cleft, -lobed, or -toothed, proximally cordate and distally angular in outline, with a few appressed hairs, the petioles 5-7 cm. long, sparsely hirsute, the stipular leaf bases 1-2 cm. long; cauline leaves alternate, the bracts of 1-3 lanceolate-linear segments, sessile; pedicels 2-9.5 cm. long in flower, 8-14 cm. long in fruit, inconspicuously appressed-pubescent; sepals 5, greenish, spreading, narrowly elliptic, 8-10 mm. long, 4-6 mm. broad, pilose dorsally, half the length of the petals, promptly deciduous; petals 5, yellow, broadly ovate, 10-15 mm. long, 8-11 mm. broad, the nectary scale small, free laterally; stamens about 25-35; achenes about 20-25 in a subglobose head possibly 10 mm. in diameter, each achene obovate, (the following measurements based upon achenes which may be sligthly immature) about 2.4 mm. long, about 2.6-2.7 mm. dorsoventrally, 1 mm. laterally, smooth (minutely reticulate), glabrous, the margin relatively inconspicuous, the beak slender

above but 0.4-0.5 mm. broad at the base, about 2 mm. long, strongly recurved through the upper half; receptacle slender, about 4 mm. long in fruit, glabrous.

Moist ground. Islands of Bering Sea and eastward across Arctic Alaska to the Richardson Mountains west of the Mackenzie River Delta. August.

Specimens examined.—ALASKA: Hall Island, Bering Sea, *Coville & Kearney 2046, US;* Porcupine River, *Turner* in 1891, *HGr, US* (type and isotype, cf. below).

YUKON: Herschel Island, Arctic Ocean, *Seale,* Aug. 11, 1896, *DS, Seale,* Aug. 31, 1896, *DS,* photograph *Pom-B, Stringer* in 1893, *Geol. Surv. Can. 12929a, Can, Stringer* in 1900, *Geol. Surv. Can. 62274, Can, Johansen 244* in 1914, *Can;* King Point, Mackenzie Bay, *Lindstrom* in 1906, *NY.*

MACKENZIE: Mouth of Mackenzie River, *Stringer* in 1893, *Can.* "East slope Richardson Mts., west of Mackenzie River Delta, from 1,000 to 4,000 feet above sea level, approx. lat. 68° N. and long. 136° W. Abundant near snowflushes, by mountain streams, 2,000-2,500 ft.," *A. E. Porsild 6810, Can, O. Bryant* in 1931 (*A. E. Porsild's No. 6591*), *Can.* Also an excellent photograph appears under the name *R. occidentalis* Nutt. var. *robustus* A. Gray in Ostenfeld, Gjöa Exped. [Christiania Vidensk. Selsk. Skr. 1909 (8):] 46. *pl. 2. f. 9.* 1910.

Type collection.—"We are glad to be able to dedicate so fine a new plant to the gentleman who has given the very best of recent contributions to our knowledge of Alaskan vegetation, Mr. J. H. Turner, who brings it from Porcupine River." Type, *Turner* in 1891, *HGr. 2811;* isotype *US 1294.*

This plant is related to each of the following: *R. acris* L. var. *frigidus* Regel, *R. occidentalis* Nutt. var. *Nelsonii* (DC) L. Benson, and *R. acriformis* A. Gray var. *typicus* and var. *montanensis* (Rydb.) L. Benson. The closest relationship is to var. *montanensis.* Several collections have become available recently, and these have shown that the connection with *R. occidentalis* var. *Nelsonii* is not as close as it appeared to be despite the fact that relationship is not distant. *R. Turneri* forms in some respects a connecting link between the Old World *R. acris* group and the Western North American *R. occidentalis* group.

THE RANUNCULUS OCCIDENTALIS GROUP

The *Ranunculus occidentalis* group or complex includes the best-known *Ranunculi* occurring on the Pacific Slope together with one series of forms occurring in the northern Rocky Mountains and on the adjacent plains. The group is a difficult one, and the inter-relationships of the various major and minor entities is reminiscent of the races of man or of dogs. Each of the five oustanding groups of forms has a separate geographical range, but the three principal ones (*R. occidentalis, R. californicus,* and *R. canus*) occurring on the Pacific Slope have common frontiers. Along these frontiers, it is possible to find here and there minor local populations. However, each of these minor groups represents only a minute percentage of the complex as a whole. Within the group commonly designated as *Ranunculus occidentalis* there are eight significant geographical populations distinguished by characters less stable than those segregating the five major members of the complex; within *Ranunculus acriformis* there are three; within *Ranunculus hexasepalus* there is one; within *Ranunculus californicus* there are five; within *Ranunculus canus* there are three. Another species, *R. Turneri,* may be interpreted as belonging to either this group or the *R. acris* group. According to the opinion of the writer,

then, in addition to scores of minor variants, there are twenty populations of sufficient distinctness and stability of associated characters to be accorded scientific names. Some might consider these to be a single species with nineteen varieties besides the typical one; others as five species each with the number of varieties indicated above; still others as twenty separate species. Any of these interpretations could be defended, but the most practical one appears to be the recognition of five species with various varieties. Recognition of more species would obliterate inter-relationships and produce difficult to unusable keys. Restricting the group to a single species is a constant temptation, but the lines of segregation seem to be barely clear enough to warrant retention in specific rank of the major groups. The characters segregating the species here recognized are summarized in the key and more fully in TABLE 2. It is to be

TABLE 2.—Species of the *Ranunculus occidentalis* group.

R. acriformis	*R. occidentalis*	*R. californicus*	*R. canus*	*R. hexasepalus*
Petals 5; 1-1.7 times as long as broad.	Petals 5-6 or in 3 vars. sometimes 5-8 or 12; 1.5-2 or rarely 1.1 or 2.5 times as long as broad.	Petals 9-16 or 26 or in 3 vars. 5 or commonly 7-12; 2 or usually 2.5-3 times as long as broad.	Petals 5-10 or in 1 var. 10-23; 1-2 or in 1 var. 2-2.5 times as long as broad.	Petals 8-12, emarginate; 1.5-2 times as long as broad. (Sepals 6.)
Achene body 2.5-3 x 2-2.8 mm.	Achene body 2.5 x 2 mm. or in vars. up to 3 x 2.5 or even 3.5 x 3.3 mm.	Achene body 2-2.8 x 1.8-2.3 mm. or in 1 var. 1-2 x 1-1.5 mm.	Achene body 4-5 x 3-4.5 mm or rarely smaller.	Achene body 3 mm. x 2.8-3 mm.
Achene beak 1-1.5 mm. long, usually 0.6-0.7 mm. broad at the base.	Achene beak 1.2-2 mm. long or in 2 vars. 0.5-1.3 mm. long, usually 0.3-0.5 mm. broad at the base.	Achene beak usually 0.4-0.8 mm. long or in 1 var. 1-1.5 mm long, 0.3-0.5 mm. broad at the base.	Achene beak 0.3-0.6 or 1 mm. long, usually 0.6-1 mm. broad at the base.	Achene beak about 1.3 mm. long, 0.3-0.5 mm. broad at the base.
Achenes 15 or mostly 20-40.	Achenes 8-15 or rarely a few more.	Achenes 5 or 10 or mostly 20-35.	Achenes 12-30.	Achenes 5-10, as far as known.
Basal leaves ternately divided and again ternately divided or parted, the ultimate segments elongate, not truly compound, never pinnate.	Basal leaves 3-lobed or parted and again lobed or cleft, the ultimate lobes not elongate, rarely pinnate.	Basal leaves of the later ones nearly always pinnate, with 3-5 leaflets.	Basal leaves simple as in *R. occidentalis* or compound as is common in *R. californicus*.	Basal leaves 3-divided and again shallowly cleft and then acutely lobed and toothed, the primary divisions cuneate.

noted particularly that the large fruit of *R. canus* is a fairly reliable character for distinction from *R. occidentalis* and *R. californicus* and that the number of petals serves to segregate all but a small percentage of the plants of *R. californicus* and its three few-petalled varieties from *R. occidentalis* and its usually 5- but sometimes 5-8- or rarely 9-12-petalled varieties *Rattanii* and *Eisenii*.

5 RANUNCULUS ACRIFORMIS A. Gray

Rather densely or at least markedly appressed- or spreading-hirsute terrestrial perennials; roots a little fleshy, 1-2.5 mm. in diameter; stems erect or decumbent at the bases, not rooting, 3-6 dm. long or perhaps sometimes longer, 2-7 mm. in diameter, 3-10-flowered, slightly or markedly fistulous, somewhat hirsute to nearly glabrous; basal leaf blades twice triternately divided or the second time cleft or parted into linear, linear-lanceolate, or broadly linear divisions 2-3 or 4 mm. broad, sometimes again once- or twice-lobed or -cleft, the blade over all 2 or 3-6 cm. long, 3 or 7-11 cm. broad, pubescent, the petioles 3-18 cm. long, rather densely or sparsely appressed-hirsute, the stipular leaf bases 4-5 cm. long; cauline leaves alternate, commonly of 3 linear divisions, sessile; pedicels 2-7 cm. long in flower, 4-10 or 12 cm. long in fruit, appressed-pubescent; sepals 5, yellowish-green, spreading or reflexed, narrowly ovate-acute, about 4-6 mm. long, 2-3 mm. broad, appressed- or spreading-pilose, about half the length of the petals, promptly deciduous; petals 5 or rarely 10, yellow, broadly obovate, 7-11 or 13 mm. long, 5-7 or 9 mm. broad, 1-1.7 times as long as broad, the nectary scale glabrous, large, rectangular, free for two-fifts to three-fourths of its length, rectangular and truncate or obovate-obdeltoid; stamens 25 or 40-80; achenes 15 or commonly 20-40 in a hemispheroidal head about 5-7 mm. long and 6-8 mm. in diameter, each achene subdiscoid, averaging 2.5-3 mm. long, 2-2.8 mm. dorsoventrally, and 0.5-1 mm. laterally, smooth (minutely reticulate), glabrous, the margin conspicuous, slightly or rarely markedly keeled, the beak stout, being 0.5 or usually 0.6-0.7 mm. broad and flattened at the base, rarely 0.3-0.6 or commonly 1-1.5 mm. long, falcate-recurving, the slender distal part projecting almost at right angles to the broad base; receptacle cylindroid to pyriform, 1-2 mm. long in flower and 3 mm. long in fruit (longer than in *R. occidentalis*), glabrous.

5a RANUNCULUS ACRIFORMIS var. **typicus,** nom. nov.*

Ranunculus acriformis A. Gray, Proc. Amer. Acad. 21: 374. 1886.

Wet meadow land at 6,000 to 8,000 feet elevation in the Plains Grassland. Sweetwater County to Laramie County, southern Wyoming; Laramer County in Colorado.

Significant specimens.—COLORADO: LARIMER CO. Laramie River, *Crandall* in 1891, *NY, US;* North Park on North Fork, *Osterhout 5166, RM;* North Park, *Osterhout 165* in 1893, *RM, 1751, RM.*

Type collection.—"*R. acris* Hook. Fl. i. 18, & Lond. Jour. Bot. vi. 66, not L.—Northern Rocky Mountains, lat. 58°, *Drummond.* Wyoming, *Parry* (distrib. as R. affinis). Wind River, *Dr. Forwood,* and near Cheyenne, *Greene.*" *Hooker,* l.c., cites

* Cf. Table 3.

TABLE 3.—Varieties of *Ranunculus acriformis*.

Var. *typicus*	Var. *montanensis*	Var. *aestivalis*
Hairs relatively abundant but not dense, appressed.	Hairs relatively abundant but not dense, spreading.	Hairs relatively dense on the stems and petioles, spreading.
Stems erect, 3-5 dm. long, about 2 mm. in diameter, leafless and unbranched in the first 2-3 dm. (first internode), 3-7-flowered.	Stems erect or decumbent below, 3-6 dm. long, 3-7 mm. in diameter, more freely branching but the first internode usually long, mostly 5-10-flowered.	Stems erect, 4-6 dm. long, 2-4 mm. in diameter, freely branching and the first internode short, about 6-10-flowered.
Basal leaf blades semicircular in outline, 3-6 cm. long, 7-11 cm. broad, twice triternately divided into linear or linear-lanceolate divisions 2-3 or 4 mm. broad, appressed-hirsute; cauline leaves mostly bracts, the chief divisions not evident because of the degree of dissection.	Basal leaf blades semicircular in outline, 2-5 cm. long, 3-10 cm. broad, divided or deeply parted, the divisions again ternately cleft or parted and often again lobed or cleft the third time, the chief divisions proximally narrowly cuneate.	Basal leaf blades reniform in outline, 3-4 cm. long, 4-7 cm. broad, divided, deeply parted, cleft, and lobed, the segments broadly linear, 2-4 mm. broad, the chief of divisions proximally cuneate.
Sepals spreading, about 4 mm. long, 2 mm. broad.	Sepals reflexed, about 4-6 mm. long, 2-3 mm. broad.	Sepals reflexed, 4-5 mm. long, 2-3 mm. broad.
Petals 5, 7-9 mm. long, 5-7 mm. broad.	Petals 5 or rarely 10, 8-13 mm. long, 6-7 or 9 mm. broad.	Petals 5, about 8 mm. long, 5-6 mm. broad.
Achene body subdiscoid, averaging 3 mm. long and 2.8 mm. dorsoventrally.	Achene body obovate, averaging 2.5 mm. long and 2 mm. dorsoventrally.	Achene body broadly and asymmetrically obovoid, about 2.5 mm. long and 2.3 mm. dorsoventrally, the margin prominent, at maturity strongly bevelled.
Achene beak about 1.5 mm. long.	Achene beak about 1 mm. long.	Achene beak 0.3-0.6 mm. long.
Receptacle cylindroid to pyriform.	Receptacle globose.	Receptacle cylindroidal to pyriform.
Southern Wyoming and adjacent Colorado.	Idaho to western Montana and the western edge of Wyoming.	South-central Utah.

the Drummond specimen as follows: "Banks of rivers in the central limestone district, and eastern primitive range, from Canada to lat. 58°, *Drummond*." It is doubtful that the Drummond specimen is this species. The other reference to Hooker, Lond. Jour. Bot. 6: 66. 1847, is to the following collection by Geyer, described but not named as a variety of *R. acris* L.: "7. . . . HAB. In a fertile swampy meadow at the Upper Sweet Water River. Aug. (n. 110)." Wyoming. Thus, all the collections, except that by *Drummond* are from the plains country of southern Wyoming. The collection from

Cheyenne, Wyoming, by *E. L. Greene*, July 3, 1882, is designated as a lectotype. Lectotype, *GH*, photograph *Pom-B*. The cotypes by *Parry* and by *Forwood* have been examined, *GH*, photographs *Pom-B*.

5b **Ranunculus acriformis** var. **montanensis** (Rydb.) L. Benson, comb. nov.*

(Liberal policy: *R. montanensis* Rydb.)

R. montanensis Rydb. Mem. N. Y. Bot. Gard. 1: 166. 1900. *R. occidentalis* Nutt. var. *montanensis* L. Benson, Bull. Torrey Club 68: 166. 1941.

Wet meadows at 5,000 to 8,000 feet elevation in the Rocky Mountain Forests. Idaho from Lemhi and Boise counties southeastward; western Montana from Powell County to Meagher County and southward; western edge of Wyoming. June and July.

Closely related to *Ranunculus occidentalis* Nutt. and considered previously as a variety of that species.

Significant specimens.—WYOMING: TETON CO. Jackson, *L. Williams 271* in 1931, *RM, Mo, Murie 1074, Mo.* SUBLETTE CO. North Beaver Creek, *L. Benson 5074, Pom-B, 5075, Pom-B, UC, US.* LINCOLN CO. Afton-Cokeville Divide, *Rollins 230, RM, Mo;* Cokeville, *A. Nelson 4627 NY.*

Type collection.—"Orton's" or "Orton's Ranch," Utah, alt. 7,000 feet, *Marcus E.*

5c **Ranunculus acriformis** var. **aestivalis** L. Benson, var. nov.*

(Moderate policy: specific rank.)

Herba hirsuta; caulibus 4-6 dm. longis, 2-4 mm. diametro, 6-10 floris; foliis in segmenta linearia 2-4 mm. lata-divisis; sepalis reflexis, 4-5 mm. longis, 2-3 mm. latis; petalis 5, 8 mm. longis, 5-6 mm. latis; acheniis obovoidis, 2.5 mm. longis, 2.3 mm. latis, rostro 0.3-0.6 mm. longo.

High valley of the Sevier River at 7,000 feet elevation. Southern Utah; known from only the type collection. Flowering in August and the first days of September.

First collection.—"Orton's" or "Orton's Ranch," Utah, alt. 7,000 feet, *Marcus E. Jones 5990*, Sept. 4, 1894, *RM 14351 and 63945* taken together as typical, these sheets having flowers, the duplicate specimens lacking complete flowers; *Pom 99359, US 303796, NY, UC* (2 sheets), *Mo*. The location of Orton's is established by consultation of Marcus E. Jones's diary for 1894 at the Pomona College Herbarium. The entries for Sept. 3 to 5 are as follows: "Sept. 3. Drove from Marysvale [Piute Co.] to Junction in p.m. . . . Sept. 4. Drove from Junction to Orton's 25 miles. Botanized along the way. Sept. 5. Drove to Panguitch Lake nearly and camped." Accordingly, Orton's was in Garfield County in the Sevier River Valley about 3 miles north of Spry. It is somewhat surprising to find this plant flowering so late in the summer and in fruit with a few flowers in early September. *Type collection.*—Cf. addenda, page 250.

6 RANUNCULUS OCCIDENTALIS Nutt.

Hirsute or sometimes glabrous terrestrial perennials; roots about 1 mm. in diameter; stems erect, suberect, or reclining, not rooting, 2-7 dm. long, 1.5-6 mm. in diameter, freely branching at least above, fistulous, hirsute or rarely glabrous; basal leaf blades simple or sometimes pinnate, fan-shaped or semicircular in outline, 1.5-5 cm. long, 2-7 cm. broad, 3-parted or sometimes

* Cf. Table 3.

-divided, the lobes cuneate, again lobed or parted, appressed-pubescent, the petioles 3-12 cm. long, hirsute, the stipular leaf bases 2-4 cm. long; cauline leaves alternate, the bracts of 3 linear divisions, sessile; pedicels 1-8 cm. long in flower, 4-12 cm. long in fruit, appressed-pubescent; sepals 5 or 6 in a few flowers of one specimen of var. *Nelsonii*, greenish-yellow, each reflexed at the middle, ovate-acute, 4-8 mm. long, about 3 mm. broad, pubescent dorsally, one-third to one-half the length of the petals, promptly deciduous; petals 5 or occasionally 6 or rarely up to 8, bright golden yellow, narrowly elliptic, 1.5-2 or rarely 2.5 times as long as broad (the claw 1-3 mm. long), 6-12 or rarely 18 mm. long, 1.5-5 or 8 mm. broad, the nectary scale glabrous, free for nearly its entire length, truncate; stamens 25-50; achenes 8-15 or rarely a few more, in a hemispheroidal cluster 5-7 mm. long and 3-4 mm. in diameter, each achene obovoid-discoid or elliptic, 2.5-3.5 mm. long, 1.5-3.3 mm. dorsoventrally, 0.3-0.4 mm. laterally, smooth, glabrous or hispid, the margin well-marked but not prominent, the beak slender, 0.5-2 mm. long, falcate or sometimes nearly straight, usually barely recurved, sometimes hooked only at the apex, prolonging the ventral margin of the body or sometimes produced from the apex; receptacle globose above, 1 mm. long in flower, 1.5 mm. long in fruit, glabrous.

6a RANUNCULUS OCCIDENTALIS var. **typicus**, nom. nov.*

R. occidentalis Nutt in Torr. & Gray, Fl. N. Amer. 1: 22. 1838. *R. occidentalis* var. *robustus* A. Gray, Proc. Amer. Acad. 21: 373. 1886. *R. tenuipes* Heller, Muhlenbergia 1: 50. 1904. *R. occidentalis* var. *laevicaulis* Suksdorf, W. Amer. Sci. 15: 58. 1906.

Mostly in vernally moist prairies or hillsides in the Pacific Forest. Pacific Slope from southwestern British Columbia to the Umpqua River Valley, Oregon; inland along the Columbia River to west Klickitat County, Washington, and The Dalles, Oregon. Late April and May.

A form with petals 15-18 mm. long and 7-8 mm. broad occurs at The Dalles (*Milburge 1431, Wash, 1592, Wash, J. W. Thompson 11353, Wash, Sheldon 10104, DS, Davidson* in 1885, *Pom*) and near Eugene (Skinner's Butte, *Bradshaw 1275, DS;* Spencers Butte, *Constance* in 1924, *DS*) and Corvallis, (*Rice* in 1902, *RM*), Oregon, as well as at Bingen, Washington (*G. N. Jones 6300, Wash.*). An exceedingly robust form with large flowers and sometimes 9 petals has been collected south of Olympia, Washington, (*Henderson*, May 10, 1892, *Wash.*). These types probably were the chief basis for var. *robustus* A. Gray, cf. discussion under var. *Nelsonii*.

Significant specimens.—BRITISH COLUMBIA: Vancouver Island and vicinity of Vancouver, common. Skidegate, Queen Charlotte Islands, Spreadborough in 1910, *Geol. Surv. Can. 84871, Can* (one plant small and typical, the other larger and more robust and tending toward var. *Nelsonii*); Mt. Brilliant, Rainbow Mountains, *Laing 515* in 1939, *Can.*

Type collections.—(1) *R. occidentalis*, "Plains of the Oregon [Columbia] River, near woods, *Nuttall! Dr. Scouler!;* Sitcha, *Bongard!*" The Nuttall specimen at Columbia University (New York Botanical Garden) has been designated as a lectotype (cf. Heller, Muhlenbergia 1: 51. 1904.), *NY;* isotype, *GH*, photograph, *Pom-B.* (2) Var.

* Cf. Table 4.

TABLE 4.—Varieties of *Ranunculus occidentalis* Nutt.

Var. *typicus*	Var. *Rattanii*	Var. *Eisenii*	Var. *ultramontanus*	Var. *dissectus*	Var. *Howellii*	Var. *brevistylus*	Var. *Nelsonii*
Hirsute.	Hirsute.	Hirsute or very rarely glabrous.	Hirsute to subglabrous.	Hirsute.	Hirsute.	Practically glabrous to soft pubescent.	Hirsute or sometimes nearly glabrous.
Stems suberect.	Stems suberect or erect.	Stems erect or suberect.	Stems flexuous, reclining or sometimes erect.	Stems erect or reclining.	Stems commonly erect or suberect.	Stems as in var. *Nelsonii*, but more slender, mostly 2-3 mm. in diameter.	Stems erect, the first internode unusually long, robust, usually 3-5 mm. in diameter.
Basal leaves simple, rather thick, 1.5-3.5 cm. long, 2-4.5 cm. broad, 3-parted or rarely-divided, the lobes cuneate, again lobed, the ultimate lobes usually not triangular, the sides commonly curving.	Basal leaves simple, typically 8-25 mm. long, 15-30 mm. broad, 3-parted, the parts oblong or usually narrowly cuneate, the ultimate lobes triangular, sharply acute.	Basal leaves as in var. *typicus* or frequently larger or pinnately compound.	Basal leaves thin, 2-5 cm. long, 2-6 cm. broad, sometimes larger, commonly simple and 3-parted, but frequently compound with 3-5 leaflets, the larger divisions typically lanceolate, but sometimes cuneate and again triangularly lobed.	Basal leaves thin, usually deeply 3-parted, the parts commonly simple and lanceolately parted, ultimate lobes not triangular, pubescence thin but silky.	Basal leaves simple and like those of var. *typicus* but often with more dense silkly pubescence.	Basal leaves simple, 2-3 cm. long, 3-6 cm. broad, deeply 3-parted, the primary divisions only 3-4-lobed or -toothed or the lateral ones parted.	Basal leaves simple, 2.5-4.5 cm. long, 2.5-7 cm. broad, deeply 3-parted, each primary part again 3-9-lobed or -toothed.

TABLE 4.—(*Continued.*)

Var. *typicus*	Var. *Rattanii*	Var. *Eisenii*	Var. *ultramontanus*	Var. *dissectus*	Var. *Howellii*	Var. *brevistylus*	Var. *Nelsonii*
Petals 5 or very rarely 6-8, narrowly elliptic, 8-12 mm. long, 3.5-5 or 8 mm. broad, 1.5-2 times as long as broad, the nectary scale, 1-2 times as long as broad, about 0.7 mm. long.	Petals 5 or 6 or sometimes up to 9, 5-8 or 10 mm. long, 2.5-3.5 mm. broad, about 2 times as long as broad, the nectary scale as in var. *typicus*.	Petals 5 or 6 or sometimes up to 8, 7-12 mm. long, 4-8 mm. broad, 1.1-2 times as long as broad, the nectary scale as in var. *typicus*.	Petals 5 or sometimes 6, *6-8 mm. long, 1.5-3 mm. broad*, the nectary scale as in var. *typicus*.	Petals 5, 5-10 mm. long, 4-6 mm. broad, 1.2-2 times as long as broad, the nectary scale as in var. *typicus*.	Petals 5 or sometimes 6, 7-12 or 18 mm. long, 3-6 or 8 mm. broad, usually 2-2.2 times as long as broad, the nectary scale as in var. *typicus*.	Petals 5, usually narrowly obovate, emarginate or rounded, 7-10 mm. long, 2.5-5 mm. broad, the nectary scale 1.5-3 times as long as broad, apically rounded.	Petals 5, or sometimes 6, 7-10 mm. long, 3.5-8 mm. broad, 1.2-2 times as long as broad, the *nectary scale unusually broad, 3-5 times as broad as long, truncate*.
Achene body obovate - discoid, 2.5 mm. long, 2 mm. dorsoventrally, glabrous.	Achene body obovate or discoid, 2-3 mm. long, 1.8-2.8 mm. dorsoventrally, glabrous or sometimes appressed-hispid.	Achene body discoid - obovate to discoid, 2-3.5 mm. long, 1.9-3.3 mm. dorsoventrally, glabrous or sometimes hispid.	*Achene body elliptic*, 2.5-3 mm. long, 1.5-2.2 mm. dorsoventrally glabrous.	*Achene body elliptic*, 2.5-3 mm. long, 2 mm. dorsoventrally, glabrous.	Achene body broadly ovate, 3 mm. long, 2.5 mm. dorsoventrally, appressed-hispid or glabrous.	Similar to var. *Nelsonii*, 2-2.7 mm. long.	Achene body asymmetrically obovate, 2.5-3 mm. long, 2-2.5 mm. dorsoventrally, glabrous.
Achene beak 1.2-1.8 mm. long, falcate, usually barely recurved, prolonging the ventral margin of the body.	Achene beak about 1 mm. long, curving or slightly recurved, prolonging the ventral margin of the body.	*Achene beak 0.5-1 mm. long*, falcate, usually recurved, prolonging the ventral margin of the body.	Achene beak 0.7-1.3 mm. long, falcate, sometimes *recurved, produced from the apex of the body*.	*Achene beak 1.5-1.9 mm. long*, slender, *straight, hooked only at the extreme tip*, prolonging the ventral margin of the body.	*Achene beak 2 mm. long, straight, hooked only at the extreme tip*, prolonging the ventral margin of the body.	Achene beak 1-1.5 mm. long, recurved or falcate, prolonging the ventral margin of the body.	Achene beak usually 2 mm. long, recurved, markedly falcate, prolonging the ventral margin of the body.
British Columbia to west-central Oregon.	Southwestern Oregon to Mendocino and Lake counties, California.	California North Coast Ranges and Sierra Nevada foothills below 3,500 feet.	California North Coast Ranges and Sierra Nevada at 4,000 to 6,000 feet.	Southwestern and Eastern Oregon and adjacent California.	Rogue River watershed, Oregon, and Siskiyou County, California.	Southern and southeastern Alaska; northern British Columbia.	Aleutian Islands and southwestern Alaska.

robustus, cf. discussion under *R. occidentalis* var. *Nelsonii*. (3) *R. tenuipes*, *Heller* "No. 3935, collected June 13, 1898 at Montesano, Chehalis [Gray's Harbor] county, Washington, altitude about 200 feet." Isotypes, *Pom 150697 and 179758, NY, US 333126 and 965824, GH, UC 118364, RM 17358*, Ill, photograph *Pom-B, Mo* (not numbered). (4) *Var. laevicaulis*, "An verschiedenen Stellen mit der gewöhnlichten Form vermengt, bei Bingen, Washington, 30 März 1886 und später (Nr. 1972)," *Suksdorf*. Type, *WSC 121337*; isotypes, *GH* (2 sheets), photograph *Pom-B, US 529737, DS 43928, Mo* (not numbered).

6b RANUNCULUS OCCIDENTALIS var. RATTANII A. Gray*
Proc. Amer. Acad. 21: 373. 1886

R. Rattanii Howell, Fl. N. W. Amer. 1: 17. 1897.

Openly wooded hills and prairies in the borderland between the Pacific Forest and the California Oak Woodland. Inner portion of the seaward coast ranges from Coos and western Josephine counties, Oregon, to Mendocino and western Lake counties, California. April to June.

The hispid achene is to be found occasionally in any of the southern varieties of *Ranunculus occidentalis*, as well as in *Ranunculus californicus* and *Ranunculus canus*. It is not necessarily a feature of var. *Rattanii* or of any other variety.

Although this variety is rather striking in its extreme form, throughout the seaward side of its distributional range it intergrades with *Ranunculus californicus* var. *gratus*. Furthermore, in the north it passes into *Ranunculus occidentalis* var. *Howellii* and in the south into var. *Eisenii*. Specimens from Del Norte County (north of Requa, *McGregor* in 1921, *DS;* Wilson Creek, *Abrams 8321, DS*) have up to 8 petals.

Specimens examined.—OREGON: CLATSOP CO. Seaside, *Gorman 1941, UO* (specimen examined in 1932; probably should be rechecked). COOS CO. Coos Bay, *Sheldon 11740,UO, 11741, UO;* forks of Coos River, *Sheldon 11741, UO* (note duplication of numbers); Arago Lighthouse, *Scullen* in 1926, *UO;* Bandon Beach, *Abrams & C. T. Benson 10615, DS.* CURRY CO. Port Orford, *Peck 9066, WillU;* Fossil Point, *Abrams & C. T. Benson 10576, DS;* Gold Beach, *Henderson 10202, UO, Hoyt 35, DS;* Summit, Pistol River to Brookings, *Abrams & C. T. Benson 10690, DS;* Carpenterville, *Henderson 11733, UO;* Brookings, *Henderson 7318, UO;* Summit of Pistol River Mountain, *J. W. Thompson 4578, DS, Wash, Mo, PA;* Snow Camp Mountain, Siskiyou Mts., *J. W. Thompson 12861, Wash;* Winchuck River, near California boundary, *Henderson* in 1928, *UO.* JOSEPHINE CO. Grants Pass, *Howell* in 1884, *Wash, UO;* Selma, *Henderson 5819, DS;* Waldo, *Abrams & C. T. Benson 10357, DS, Walpole 2103, NR, Howell* in 1884, *UO;* 10 miles southeast of Takilma, *Hitchcock & Martin 5197, DS, Wash;* Oregon Caves Highway, *Meola 3* in 1939, *Utah;* Caves City to Waldo, *Eastwood & Howell 1367, Pom;* Bear Camp Lookout, Siskiyou National Forest, *Mr. & Mrs. J. R. Leach 1861, UO;* Oregon-California Line, Grants Pass to Crescent City, *Peck 8087, WillU.* JOSEPHINE OR JACKSON CO. Applegate Valley, *J. W. Thompson 2204, DS;* Agnes, Rogue River, *Applegate 7196, DS.* It is to be noted from the citations above that the range of this variety in Oregon is almost wholly distinctly to the west of that of var. *Howellii*.

CALIFORNIA: DEL NORTE CO. Adams Station, Waldo to Crescent City, *Eastwood 248, NR, 15071, NR;* Crescent City, *Eastwood 265, NR, Howell 1401, HGr, Wash, Mo* (on inspection of the *UO* dupilcate, a note was recorded that it is not this variety); Wilson Creek, Requa to Crescent City, *Abrams 8321, DS, RM, Pom;* Requa, *McGregor in 1921, DS; Klamath, W. C. & N. W. Muenscher 15090, WSC;* Patrick's Creek, *Abrams 8560, DS;* Gasquet, *J. P. Tracy 11297, DS.* HUMBOLDT CO. Clam Beach, Trinidad, B., *R., & C. B. Maguire 15179, Utah;* Eureka, *J. P. Tracy 826,*

* Cf. Table 4.

UC, 1107½, UC; Campbell's *Chestnut & Drew* in 1888; *UC;* Fruitland Hill, *Kildale 1918, DS;* Look Prairie, Bull Creek Watershed, *Constance 645, WSC;* Alder Point, Eel River, *J. P. Tracy 1908, UC;* South Fork Mountain, *D. Kildale Gillespie 10639, DS.* MENDOCINO CO. Belle Spring Mt., *Blankinship* in 1893, *UC* (teratological form with floral parts green and leaf-like); Sherwood Valley, *Dudley* in 1899, *DS; Hitchcock* in 1915, *US;* Laytonville, *Davy & Blasdale 5306, UC;* Hearst, South Fork of Eel River, *Bacigalupi 1557, DS, Pom;* Midway between Mendocino City and Comptche, *Eastwood & Howell 2702, DS, CAS;* Comptche, *Walker 353, NR;* Kaisen District, *McMurphy 250, DS;* Osborne's, Forest Reserve, *Eastwood 15342, CAS;* Black Rock Ridge, Ukiah, *Eastwood, CAS;* Jct. U. S. 101 and Ft. Bragg Road (probably McDonald on former U. S. 101 northwest of Cloverdale) *Kildale 4396, DS;* 10 miles south of Squaw Creek, U. S. 101, *B., R., & C. B. Maguire 15179, Utah.* LAKE CO. Lakeport, *Bentley* in 1917, *DS;* West side of Bartlett Mt., *Abrams 12410, DS;* Mt. Konocti (Uncle Sam Mt.), *Eastwood* in 1900, *NY;* Bottlerock Mt., *L. Benson 3670, Pom-B, DS;* Cobb Valley, *L. Benson 3684, Pom-B, DS, RM.*

Type collection.—"N. California on the Klamath, Rattan." The type specimen in the Gray Herbarium is labelled as follows :"Common on the Klamath, Calif. *V. Rattan,* June, 1879." Type, *GH,* photographs *Pom-B, DS;* isotype, *DS 49433.*

6c RANUNCULUS OCCIDENTALIS var. EISENII (Kell.) A. Gray*, Proc. Amer. Acad. 21: 373. 1886

(Very liberal policy: *R. Eisenii* Kell.)

R. Eisenii Kell. Proc. Calif. Acad. 7: 115. 1876.

Vernally moist ground in the California foothills and mountain valleys at 300 to 4,000 feet elevation or up to 7,000 feet in Kern County. Occurring in the California Oak Woodland beneath oaks (leaves simple) or in vernal meadows and rivulets (leaves compound). North Coast Ranges mostly below 3,000 or 3,500 feet from (eastern) Humboldt and Shasta counties to (eastern) Mendocino and (eastern) Napa counties; Sierra Nevada foothills; Greenhorn and Tehachapi Mountains; West Butte, Sacramento Valley. Late February to May or sometimes June.

Var. *Eisenii* intergrades with *Ranunculus californicus* at Healdsburg, Sonoma County, and along the south base of Mt. St. Helena, Napa County, where 5-petalled and 9-16-petalled plants occur together. Cf. collections by the writer under these names, *Pom-B.*

The forms with compound leaves from vernal meadows and the forms with simple leaves from oak woodland mentioned above maintained their characters after transplanting by the writer to identical environments in adobe soil at Menlo Park, California, in 1935.

A glabrous form with dissected leaves (*L. Benson 6316, Pom-B*) grew in water at Stubbs Ranch Junction north of Lower Lake, Lake County.

The forms of *Ranunculus occidentalis* growing from southeastern Jackson County and Klamath County, Oregon, to Shasta County and Chester, Plumas County, California, are intermediate between the varieties *Eisenii* and *ultramontanus,* having mostly the fruit of var. *Eisenii* and the leaves of var. *ultramontanus.* OREGON: JACKSON CO. Ashland, *Peck 9299, PA, WillU.* KLAMATH CO. Klamath Falls, *Applegate 3493, DS, UC;* Keno, *Peck 9383, WillU, DS, Mo, PA; 16779, WillU, Applegate 2019, DS;* Sprague River *A. Evans 57* in 1931, *PA;* Swan Lake Valley, *Applegate 7* in 1896, *US.* COUNTY UNCERTAIN. Pine Creek, *Austin* in 1893, *HGr.*

CALIFORNIA: SISKIYOU CO. Yreka, *Greene 649* in 1876, *PA, HGr; Butler 1199,*

* Cf. Table 4.

UC, Pom, CAS; Bald Mt., Greta, *Butler 647 UC, DS.* SHASTA CO. Goose Valley, *Eastwood 761, CAS;* McArther, *C. L. Hitchcock 6633, Utah.* MODOC CO. *M. S. Baker* in 1893, *UC;* Ross Cañon, *Austin & Bruce 2305, NY;* Goose Lake, *Austin 52* in 1895, *Pom;* Parker Creek, Warner Mts., *J. T. Howell 11965, CAS, DS, Payne 34, CAS;* Plum Valley, Warner Mts., *J. T. Howell 12024, CAS.* LASSEN CO. Long's Well, *J. T. Howell 12550, CAS.* PLUMAS CO. Road to Westwood from Chester, *J. T. Howell 624, CAS.*

Significant specimens.—CALIFORNIA: SISKIYOU CO. Yreka, *Greene, HGr* (possibly var. *Howellii;* specimen not seen since 1935 and under the terms of the bequest of this herbarium not available for shipment on loan); Oro Fino, *Butler 362, Pom;* Bald Mountain, road from Mt. Hebron ot Montague, *Gould 1252, Pom-B, CAS;* Northeast Base of Mt. Eddy, *Heller 12118, NR.* MODOC CO. Happy Camp Ranger Station, *Eastwood & Howell 8283, Pom, CAS;* Forestdale, *M. S. Baker* in 1896, *HGr.* SUTTER CO. West Butte, *L. Benson 6644, Pom-B.* KERN CO. Woody to Glennville, *L. Benson 3277, Pom-B;* Woody, *Harwood 126* in 1925, *Pom-B;* Greenhorn Peak, *L. Benson 3649, Pom-B* (at 6,000 feet elevation); Greenhorn Mts., *Palmer 102, US;* Mt. Breckenridge, *L. Benson 4436, Pom-B* (at 7,000 feet elevation), *F. Grinell 149, NR, 185, NR;* Walker Basin, *Brandegee* in 1891, *UC, F. Grinnell 85, NR, Evermann* in 1915, *NR;* Walker Basin to Caliente, *L. Benson 3485, Pom-B;* Coburn's Mill, *Jepson* in 1891, *UC, Brandegee* in 1891, *UC;* Tunis Mill, *Brandegee* in 1891, *UC.*

Type collection.—(cf. Proc. Calif. Acad. 7: 89. 1876) "Dr. Eisen, of Sweden, placed in our hands for determination his plants from near Fresno, Cal." The type is not known, and it may have been destroyed in the San Francisco earthquake and fire of 1906, which destroyed the herbarium of the California Academy of Sciences. According to Curran, though, (Bull. Calif. Acad. 1: 130: 1885) it disappeared much earlier. According to her, "*Ranunculus Eisenii* Kellogg, Proc. Cal. Acad. vii. 115. Probably R. NELSONII VAR. TENELLUS, Gray, but the specimen has disappeared from the herbarium, and the identification is not certain." The following information was sent by Dr. Eric Hultén, Botaniska Museet, Lund, Sweden, "As far as I have been able to find there is no specimen of Ranunculus Eisenii in Swedish herbaria. I have never seen any California specimens collected by Eisen in Swedish Museums." We adopt the interpretation of Dr. Gray, Proc. Amer. Acad. 21: 373. 1886. His reference is to a plant determined by Torrey as *Ranunculus canus* Benth, cf. Torr. Pac. R. R. Rept. (4): 62. 1857. The collection was cited as follows: "Hill sides, Duffield's Ranch, Sierra Nevada; May 11." The specimen in the Gray Herbarium was collected by Bigelow. It is designated as a neotype.

6d RANUNCULUS OCCIDENTALIS var. ULTRAMONTANUS Greene,*

Pittonia 3: 13. 1896 (Liberal policy: *R. alceus* Greene)

R. alceus Greene, Erythea 3: 69. 1895. *R. ultramontanus* Heller, Mulenhergia 6: 11. 1910. *R. occidentalis* var. *alceus* Jepson, Fl. Calif. 1. 540. 1922.

Meadows and moist ground along mountain streams at 4,000 to 6,500 feet elevation in the Sierran Forest and by streams at the upper edge of the California Oak Woodland. California in the North Coast Ranges as far south as Elk Mountain, Lake County, and largely on the eastern side of the Sierra Nevada from Mt. Shasta to Tuolumne and Inyo counties and to the vicinity of Reno and Carson City, Nevada; in modified form occurring at a few stations east of the Cascade Mountains in southern and central Oregon. June and July.

Significant specimens.—OREGON: DESCHUTES CO. Paulina Lake, *Applegate 7335, DS, Pom-B.* JACKSON CO. *Peck 15096, WillU.* KLAMATH CO. Klamath Valley, *Cronkhite 86, US;* Lake-of-the-Woods, *Applegate 187, DS;* 2 miles northeast of Swan

* Cf. Table 4.

Lake, *Maguire & Holmgren 26577* in 1946, *Pom.* LAKE CO. Fremont National Forest, *Stewart 39, US;* Lakeview, *Peck 15280, WillU.*

CALIFORNIA: HUMBOLDT CO. Snow Camp, *Kildale 10546, DS, 10566, DS;* Horse Mountain, *J. P. Tracy 7618, UC.* TRINITY CO. Post Creek Mountain, *J. P. Tracy 6484, UC;* northeast of Weaverville, *Yates 350, US.* TEHEMA CO. South Yollo Bolly, *Jepson* in 1897, *J.* LAKE CO. Thistle Springs, Mt. San Hedrin, *Heller 5993, Pom-B, DS, RM, Ill, Mo;* Bear Creek, Snow Mountain, *L. Benson 3730, Pom-B, 3732, Pom-B, RM;* Snow Mountain, *T. S. Brandegee* in 1891, *UC.* CALAVERAS CO. Leland Meadow, *Quick* in 1940, *Pom, WSC;* Strawberry, *Abrams 4737, DS, Evans* in 1918, *UC, L. S. Rose 42211* in 1942, *Utah, Wiggins 8515, DS, Pom.* TUOLUMNE CO. Pinecrest, *C. Dudley* in 1940, *Pom-B;* Mt. Dana, *Meiers* in 1916, *CAS, Wiggins 6812, WSC;* Hetch Hetchy Valley, *H. M. Hall 3371, UC.* INYO CO. *Rixford* in 1892, *NR* (probably *US*).

Type collections.—(1.) *R. alceus,* "Collected at an altitude of about 4,000 feet on Elk Mountain, Mendocino [Lake] Co., Calif., July 1892, by Mr. Jepson." Elk mountain is in Lake County. This error was corrected by Jepson, Fl. Calif. 1: 540. 1922, "type loc. Elk Mt., Lake Co., Jepson." The type has not been located in the Herbarium Greeneanum or in Dr. Jepson's working collection. (2) Var. *ultramontanus,* "Banks of streams and lakes, or in moist meadows along the Truckee River, at the eastern base of the Sierra Nevada, Calif." The Herbarium Greeneanum includes only one specimen collected there by Dr. Greene prior to 1896, and it was chosen as a lectotype, cf. L. Benson, Bull. Torrey Club 68: 165. 1941. It was obtained near Boca on the Truckee River, California, on July 24, 1895 (*HGr 2726*).

6e RANUNCULUS OCCIDENTALIS var. DISSECTUS Henderson,* Rhodora 32: 25. 1930 (Liberal policy: *R. ciliosus* Howell)

R. ciliosus Howell, Fl. N.W. Amer. 1:17. 1897. *R. marmorarius* Jepson & Tracy in Jepson, Fl. Calif. 1: 542. 1922.

Meadows of mountains and high plains at 4,000 to 7,000 feet elevation in the Sierran Forest. Southwestern Oregon in the vicinity of the Rogue River-Umpqua River Divide and the Cascade and Siskiyou Mountains; Eastern Oregon from Deschutes County to Grant County, in western and southern Klamath County, and in southern Lake County; Marble Mountains and Quartz Valley, Siskiyou County, and the Warner Mountains, Modoc County, California. June and July. This plant occurs both west and east of the Cascades and it may antedate that mountain range. However, since the passes are relatively low, this is not necessarily the case.

Specimens examined.—OREGON: Eastern Oregon, *Howell* in 1882, *UC.* DOUGLAS CO. Diamond Lake, *Peck 19286, Wash, Leiberg 4293, US, UO.* JOSEPHINE CO. Wolf Creek Pasture, *Ingram B807, UO.* JACKSON CO. South base of Hershberger Mt., *Applegate 6020, DS, Wash;* Red Mt., Siskiyou Mts., *J. W. Thompson 12400, Pom-B, Wash;* Grizzly Peak, *Peck 6410, WillU;* Huckleberry Mt., Rogue River Nat. For., *J. W. Thompson 13006, Wash, Mo, WSC.* DESCHUTES CO. Redmond, *Whited 217, DS;* Davis Lake, *Peck 16957, WillU, Clo;* Deschutes River, *Whited 217* in 1920, *WSC,* Tumalo, *Whited 320* in 1920, *WSC, 320a* in 1921, *WSC, 320* in 1922, *WSC;* Bend, *E. Nelson* in 1905, *Mo, Peck 7040, WillU;* Upper Paulina Creek, Paulina Mts., *Detling 77, UO;* Lapine, *Peck 9608, Mo, WillU, DS, PA;* 33 miles south of Bend, *Maguire & Holmgren 26478* in 1946, *Pom.* CROOK CO. Bear Valley, *Howell in 1885* (type collection of *R. ciliosus,* cf. below), *UO* (photographs *NY, US, GH, Mo*), *HGr, NY, DS,* in 1907, *HGr* (topotype of *R. ciliosus*); Summit Prarie, *Cusick 2643 Pom, HGr, Mo, UC, RM;* Farewell Bend, *Leiberg 429, UC, GH, US;* Big Meadows, *E. Nelson 835* in 1905, *RM;* Laidlaw (Crook Co. ?), *Whited 320* in 1920, *GH, Mo, DS;* Ochoho Forest, *Peck 17221, WillU.* GRANT CO.

* Cf. Table 4.

18 miles south of John Day, *Muenscher & Muenscher 15644, GH, Mo;* Strawberry Mts., Burns to Canyon-City, *Henderson 9044, NR, UO.* KLAMATH CO. Crescent, *L. Benson 1689, Pom-B, DS, Mo;* Lake-of-the-Woods, *J. W. Thompson 13120, Wash, US, WSC, Coville & Applegate 187, US, Peck 16663, WillU;* Pole Bridge, Crater Lake National Park, *Applegate 9564, DS* (topotype); Summit [of the] Cascades, *Austin in 1893, UC;* Ft. Klamath, *Constance in 1928, UO,* in 1935, *UC;* Klamath Valley, *Cronkhite 86, UC;* Klamath Marsh, *Peck 21936, Clo;* Silver Lake to Fort Klamath, *Furlong, Greeley, Wilson, & Alexander* in 1901, *UC;* North Fork of Sprague River, *Coville & Leiberg 249, US;* Sprague River, *Austin, UC;* Sprague River west of Bly, *Coville & Leiberg 2860, UO, US;* Between Merrill and Cottonwood, *Furlong, Greeley, Wilson, & Alexander* in 1901, *UC;* northeast of Gilchrist, *Ripley & Barneby 6655, Pom.* LAKE CO. Paulina Marsh, *Constance* in 1928, *UO;* Campbell's Lake north of Gearhart Mt., *Applegate 7921, DS, Pom-B, Mo;* Quartz Pass, *J. W. Thompson 12184, Pom-B, DS, Wash, Mo;* Barley Camp, Big Lake, *Eggleston 6948, US;* Hart Mt. Junction north of Lakeview, *Detling 4205, UC, Wash;* Chandler Park, *Peck 19446, Clo.*

CALIFORNIA: SISKIYOU CO. Marble Mt., *Chandler 1691, UC, NY, US, DS, GH, Mo* (isotypes of *R. marmorarius,* cf. below); Sky High Valley, Marble Mts., *J. T. Howell* in 1939, *CAS;* Quartz Valley, *Butler 683, UC* (achene beaks rather short). MODOC CO. Lost Lake, Warner Mts., *J. T. Howell 12113, CAS, Schreiber 1160, UC;* Eagleville to Patterson's Mill, *Alexander & Kellogg 4697, Pom.*

Type collections.—(1.) *R. ciliosus,* "Moist banks, in Bear Valley, Blue Mountains, Oregon. *Howell,* May 23, 1885." *Howell 1907.* Type, *UO,* photographs, *NY, US, GH* (rephotograph Pom-B), *Mo* "No. 1507"; *Isotypes, HGr 2471, NY, DS 96058.* (2.) *R. marmorarius,* "Marble Mt., western Siskiyou County, California, *Chandler* (type)." *Chandler 1691.* Type, *UC;* Isotypes *NY, US 412767, DS 43905, GH,* photograph *Pom-B, Mo* (not numbered). (3.) Var. *dissectus,* "Dry slopes of Crater Lake Park, OREGON, near Pole Creek Brodge, where collected by *Lyle Wynd,* July 12, 1928. His no. 2221." Type, *UO.*

6f RANUNCULUS OCCIDENTALIS var. HOWELLII Greene*,
Pittonia 3: 14. 1896 (Liberal policy: *R. Howellii* Greene)

R. Howellii Greene in Howell, Fl. N.W. Amer. 1: 17. 1897.

Openly wooded hills at 1,000 to 4,000 feet elevation in the Pacific Forest and the California Oak Woodland. Rare in Curry County and abundant on the Rogue River watershed in Jackson and Josephine Counties, southwestern Oregon; Siskiyou County, California. Late March to May or June.

A form with the dorsal sides of the petals reddish-purple has been collected near Medford, *J. W. Thompson 2122,* April 8, 1927, *DS 171825, PA.* This coloring is common in *R. orthorhynchus* var. *typicus.* This plant may be an unnamed variety of either *R. occidentalis* or *R. orthorhynchus* or a new species, and thorough collection and field study are needed. It may be of hybrid origin. Cf. page 96.

Specimens examined.—OREGON: CURRY CO. Brookings, *J. H. Thompson 109, DS;* Agness, Rogue River, *Applegate 7196, Pom-B, DS.* JOSEPHINE CO. 10 miles north of Grants Pass, *L. Benson 1090, DS, Pom-B;* Sexton Mt., *J. W. Thompson 2064, Wash;* Rogue River, *Sherwood 753, NR;* Grants Pass, *Prescott* in 1910, *NR,* in 1912, *Wash, Howell* in 1884, *US,* in 1887, *UC, PA, HGr, Mo, Dale* in 1913, *DS;* Gilbert Creek near Grants Pass, *Dale* in 1913, *DS;* Selma, *Henderson 5819, CAS, RM, J. W. Thompson 2274, PA;* Oregon Caves Highway, *Meola & Powell 3* in 1939, *Clo;* Caves City to Waldo, *Eastwood & Howell 1367A, CAS;* Waldo, *Gould 1046, Pom-B, Clo;* West Fork of Illinois River, Waldo Jct., *Kildale 7399, DS;* Takilma, *Kildale 7427, DS;* Deer Creek, *Kildale 7383, DS;* *Mendenhall Creek,* near Waldo, *Kildale*

* Cf. Table 4.

7329, DS. JACKSON CO. Gold Hill, *L. Benson 1082 Pom-B, DS, 1086, Pom-B, DS, Wash, Peck 14756, WillU;* Weimer, *Hammond 4* in 1893, *CAS, RM, Mo, PA;* Ashland, *Howell 1331 HGr, NY, US, UC, Wash,* photograph *Pom, Mo, PA* (type and isotypes, cf. below); Siskiyou Summit, U.S. 99, *L. Benson 1081, Pom-B, DS, Wash, J. W. Thompson 2200, DS, PA, Sherwood 679, NR, Henderson 12449, UO;* Between Klamath Jct. and Green Springs Mt., *M. S. Baker 7374 CAS.* COUNTY UNCERTAIN. Sykes Creek, *Hammond* in 1892, *UO;* Applegate Valley, *J. W. Thompson 2204, PA.*

CALIFORNIA: SISKIYOU CO. Scott River, *Butler 568, UC, DS, Pom;* Greta, *Butler 567, Pom, UC;* Quartz Valley, *Butler 683, Pom, NR.* The following specimen from Siskiyou or Modoc County may belong to this variety: Juniper Hill, Egg Lake, *M. S. Baker, UC.*

Type collections.—"Dry hillsides near Ashland, Oregon, 1899; collected by Mr. Howell." *Howell 1331.* Type, *HGr 2736;* isotypes, *NY, US 213625, UC 118174, Wash (J. W. Thompson Herb. 18301),* photograph *Pom, Mo* (not numbered), *PA* (not numbered).

6g RANUNCULUS OCCIDENTALIS var. BREVISTYLIS Greene,*

Pittonia 3: 14. 1896 (Liberal policy: specific rank)

Coastal areas and mountain meadows up to at least 3,000 feet elevation in the Pacific Forest and in the Arctic Grassland and Tundra. Southern and southeastern Alaska; Yukon to northern British Columbia (either rare or more likely restricted to out-of-the-way places) and the Rocky Mountains in Alberta.

Occasional short-styled plants occur in var. *Nelsonii* (presumably) in even the Aleutian Islands, e. g. Nazan Bay, Atka, *Van Dyke* in 1894 *Can.*

Specimens examined.—ALASKA: Talkeetna Mts., Matanuska, *J. P. Anderson 1020, ISC, Pom-B, 1059, Pom-B, ISC;* Subalpine rivulet, mountains between Palmer and Willow, *Dutilly, LePage & O'Neill 21976, Pom;* Hatcher Pass between Palmer and Willow, *Dutilly, LePage, & O'Neill 22075, Pom;* Mineral Creek, 8 miles northwest of Valdez, *Dutilly, LePage, & O'Neill 21387, Pom;* Juneau, *J. P. Anderson 6253, PA, Pom-B, Shumway* in 1891, *Wash, Cowles* in 1907, *Ill;* "Mt. R.," Juneau, *J. P. Anderson,* June 30, 1940, *ISC;* Hoonah, *Mr. & Mrs. E. P. Walker 689, DS, RM, Mo;* Head of Freshwater Bay, Chichagof Island *J. P. Anderson 3050, ISC, 3123, ISC;* Sitka, *Shaw* in 1907, *WSC;* Mole Harbor, Admiralty Island, *K. Stephens 95, UC;* Coastal areas, southeastern Alaska, *Mr. & Mrs. E. P. Walker 1173, DS, RM;* Cordova, *Church, NR;* Behm Canal, *Gorman* in 1894, *HGr;* Spacious Bay, *Gorman 15* in 1893, *NR;* Loring, *Chamberlain 26* in 1903, *NY;* Ratz Harbor, Prince of Wales Island, *Flett 1958, WSC;* Yes Bay, *Gorman 1602, HGr, NY* photograph *Pom-B, DS, UC, Mo,* (type collection cf. below), *Gorman* in 1892, *HGr;* Bradford Inlet, Lat. 56°, Long. 131°, Canavan in 1894, *Can;* Deer Mt., Ketchikan, *J. P. Anderson* in 1927, *ISC, Pom-B, Went 88, UC,* Gravina Island, Ketchikan. *J. P. Anderson 5353, ISC, Willett 24* in 1925, *WSC;* Hyder, *J. P. Anderson 5476, ISC, Whited 1174, Mo;* Short Bay, *Gorman 49* in 1890, *HGr.*

YUKON: Canol Road: Granite mountain range west of upper Rose River, opposite mile 95, 5,600 to 6,000 feet, *Porsild & Breitung 10565, Can;* Haines Road: near mile 85, *C.H.D. Clarke 519* in 1944, *Can.*

BRITISH COLUMBIA: Mountains at the head of Harrison Creek 20 miles north of Takla Landing, *McCabe 8057, Pom-B;* 9-Mile Mountain, northeast of Hazelton, *McCabe 8207, Pom-B;* Tsi-tsutt Mts., *Dawson* in 1876, *Can.*

ALBERTA: Head of Smoky River, Moose Pass Branch, *N. Hollister 5* in 1911, *US 622641;* Calumet, Mt. Robson, *Sanson 58,* July 29, 1924, *NY;* Continental divide between Lat. 53 and 54°, *Lambart 45* in 1924, *Can.*

Type collections.—"Shores of Yes Bay, Alaska, 1895, Mr. Howell." *Howell 1602.* Type, *HGr 2465;* isotypes, *NY,* photograph *Pom-B, DS 97036, UC 118170, Mo* (not numbered), *US 268797.*

* Cf. Table 4.

6h RANUNCULUS OCCIDENTALIS var. NELSONII (DC) L. Benson,*
Bull. Torrey Club 68: 166. 1941

(Liberal policy: *R. Nelsonii* (DC.) A. Gray)

R. recurvatus Poir. var. *Nelsonii* DC. Syst. 1: 290. 1818. *R. Nelsonii* A. Gray, Proc. Amer. Acad. 8: 374. 1872. *R. Nelsonii* subsp. *insularis* Hult. Svensk. Bot. Tidskr. 30: 526. 1936. *R. occidentalis* subsp. *Nelsonii* Hult. Fl. Alaska & Yukon, Lunds Univ. Arssk. II. 40(1): 762. 1944. *R. occidentalis* subsp. *insularis* Hult. *loc. cit.*

Common in moist ground at low elevations. Aleutian Islands and the southwestern coast of Alaska.

Type collections.—(1) Var. *Nelsonii*, In insulâ Unalaskâ unâ ex Aleutiensis. D. Nelson." (2) Subsp. *insularis*, "Aleutian Islands: Amchitka, July 9, 1932. Hn No. 6463 (type)." "Distributed to several European and American Museums."

According to Hultén, *loc. cit.* 762-3, subsp. *insularis*, occurring in the western Aleutian Islands, differs ". . . in the shorter and broader beak of the achenes and in more adpressed, silky grey pubescense of the leaves as well as in more rounded ultimate leaf-segments and lower, less robust growth." In the very extensive series of specimens of var. *Nelsonii* examined by the writer, distinction of this type with any consistency has not seemed to be possible. Perhaps field study may serve as an aid in differentiating this entity, and final judgment is suspended for the time being.

According to Hultén *loc. cit.* 763, "The earliest varietal name of ssp. *Nelsonii* is *R. occidentalis* var. *robustus* given by *A. Gray* already in 1895. There is thus no need for the combination *R. occidentalis* var. *Nelsonii* proposed by BENSON." Dr. Gray had been dead for seven years in 1895, and it is probable that the reference above is to Gray's *Synoptical Flora of North America*, edited and somewhat revised here and there by B. L. Robinson. This was not the original publication of *R. occidentalis* var. *robustus*, and the interpretation given to *R. occidentalis* and most of its forms differs radically from that appearing in Gray's last work on *Ranunculus*, (his paper, *A revision of the North American Ranunculi*, Proc. Amer. Acad. 21: 363-378. May 4, 1886, which appeared only 19 months before his last illness). In this work (372-4) obviously Gray was so puzzled by the maze of forms in *R. occidentalis* and its relatives that he included under *R. occidentalis* even the *R. uncinatus* (*R. tenellus* or *R. Bongardii*) complex. Var. *robustus* was published first in this paper, but it was based partly upon an earlier treatment of the group, and it was an assemblage of forms drawn from at least two of the varieties of *R. occidentalis*. Hultén's statement concerning the lack of need for the combination *R. occidentalis* var. *Nelsonii* may be contested upon the grounds of *application* of the epithet var. *robustus* to this entity, and it may be refuted altogether by the International Rules of Botanical Nomenclature concerning priority of epithets.

1. *Application.*—Asa Gray, Proc. Amer. Acad. 21: 373. 1886, gave only the following statement of use in the typification of var. *robustus*, "*R. occidentalis* Gray, Proc. Am. Acad viii. 374. [1872.] R. n. sp. *forma prima, flores magni* Schlect. Animad. Ranunc. ii. 28, under *R. recurvatus*.—Chiefly Alaskan." At least two entities are included—in the first reference, var. *typicus*

* Cf. Table 4. Some of the flowers of one specimen have 6 sepals.

primarily and probably var. *brevistylis* secondarily; in the second reference, presumably var. *Nelsonii*. "*R. occidentalis*" of Gray's earlier publication was based upon material from "Oregon, British Columbia, and Sitka," including the collections of Elihu Hall in Oregon in 1871. There can be little doubt that the discussion was inspired by Hall's collections, since the subtitle of the article (372) is as follows: "2. *Determination of a Collection of Plants made in Oregon by* ELIHU HALL during the summer of 1871, *with Characters of some New Species and various Notes.*" As pointed out above under *R. occidentalis* var. *typicus*, occasional plants of that variety from Western Oregon are remarkably large-flowered and often robust, and probably Gray was impressed with one of these in the Hall collection together with robust and large-flowered specimens of var. *typicus* from British Columbia and at least one plant from Sitka, Alaska, representing probably var. *brevistylis*. The other basis for var. *robustus* is the reference to Schlectendal. Between 1872 and 1876, Gray found that apparently most of the large-flowered robust types came from Alaska (these being var. *Nelsonii*). His statement (1886) that var. *robustus* was "chiefly Alaskan," could be interpreted either as an intention of applying the name principally to var. *Nelsonii* or merely as a statement that the robust types were represented in the Gray Herbarium in 1886 by more specimens from Alaska than elsewhere. The writer is inclined to the latter interpretation, since if Gray had considered Alaskan material as typical and really the basis for the variety and if he had distinguished it in any way from the southern type, likely he would have excluded the collection of Hall and others from Oregon and British Columbia or at least he would have stated reservations concerning them. It is obvious, as pointed out above, that in 1886 Gray was baffled by the varieties of *R. occidentalis*, as well he might be in view of the limited material then available. Consequently, the writer is of the opinion that var. *robustus* should be considered as an epithet of uncertain application based upon material of *R. occidentalis* drawn from var. *typicus*, probably var. *brevistylis*, and var. *Nelsonii*, at least in so far as the original publications are concerned.

In the *Synoptical Flora of North America*, Robinson implied application of the epithet *robustus* to var. *Nelsonii* in his statement of the range of the variety as it appeared to him, that is, "Alaskan Islands, especially Unalaska, Attar, Kyska, &c., *Harrington, Dall, &c.*" Since Dr. Hultén cites only 1895, it is probable that his application of this epithet is based upon Robinson's geographical range and that he has overlooked the interpretation of this entity by the writer, Bull. Torrey Club 63: 162-3. 1941 (where the subject was set forth briefly) as well as the earlier publications by Gray referred to there. Even Robinson's interpretation still leaves typification of var. *robustus* dangling between "Schlectendal's *'forma prima' with 'flores magni'*, and the type of *R. occidentalis*, Gray, Proc. Am. Acad. viii. 374", despite Robinson's restriction of range to the Alaskan Islands, which were not even mentioned by Gray in 1872. As shown below, whichever interpretation may be adopted, for the moment at least, the only gain is determination of which list of synonyms var. *robustus* should be placed in.

1. *Priority.*—International Rules of Botanical Nomenclature 17. 1935, Article 56, "When two or more groups of the same rank are united the oldest

legitimate name or (in species or their subdivisions) the oldest legitimate epithet is retained." Page 16, Article 55, "When a variety or subdivision of a species is transferred, without change of rank to another genus or species (or placed under another generic or specific name for the same genus or species), the original subdivisional epithet must be retained or (if it has not been retained) must be re-established, unless . . . there is an earlier validly published epithet available." Article 55 applies directly to the transfer of var. *Nelsonii* from *R. recurvatus* to *R. occidentalis*, (cf. L. Benson, Bull. Torrey Club 68: 166. 1941). The varietal epithet *robustus* was published in 1886. The epithet *Nelsonii* was published in varietal rank under *R. recurvatus* Poir. in DeCandolle's Systema 68 years earlier in 1818 as stated by the writer in 1941 (not first in DeCandolle's Prodromus in 1824).

7 **Ranunculus hexasepalus** L. Benson, comb. nov.

Ranunculus occidentalis Nutt. var. *hexasepalus* L. Benson, Bull. Torrey Club 68: 167. 1941.

Hirsute terrestrial perennials; roots 1-2 mm. in diameter; stems erect, not rooting, about 4-7 dm. long, about 2-6 mm. in diameter, branching particularly above, fistulous, hirsute; basal leaf blades simple, 3-parted, each primary division or part again twice- or more -lobed to -cleft, 5-13-lobed or -cleft altogether, mostly 3-5 cm. long, 3-6 cm. broad, hirsute, proximally cordate, apically rounded in outline, the petioles mostly 10-15 cm. long, hirsute, the stipular leaf bases well-developed; cauline leaves alternate; pedicels about 2-7 cm. long in flower, a little longer in fruit; sepals usually but not quite always 6 (a number unique in *Ranunculus* except in some flowers of one specimen of *R. occidentalis* var. *Nelsonii*), yellowish-green, reflexed, about 4-5 mm. long, much shorter than the petals, promptly deciduous; petals 8-12, yellow, narrowly obovate, 11-13 mm. long, 3-4 or 7-8 mm. broad, mostly about twice as long as broad, the nectary scale glabrous, once or twice as long as broad, truncate; stamens about 40-60; achenes 5-10 in a sublobose cluster about 4 mm. long and 8 mm. in diameter, each achene discoid, 3 mm. long, 2.8-3 mm. dorsoventrally, 0.3 mm. laterally, sparsely appressed-hispid, the margin clearly marked, the beak about 1.3 mm. long, recurved; receptacle cylindroidal, 1-2 mm. long in flower, apparently glabrous.

Moist ground in the Pacific Forest. Queen Charlotte Islands, British Columbia. Summer.

Closely related to *R. occidentalis* var. *Nelsonii*. Of rather doubtful status as a species, as is the case with all species of the *Ranunculus occidentalis* group, but as strong as any of the others.

Significant specimens.—BRITISH COLUMBIA: Queen Charlotte Islands, *Boas 86* in 1901, *NY*, *Keen 10* in 1898, *NY* (type); Skidegate inlet, *Newcombe* in 1897 (*Geol. Surv. Can. 18054*), *HGr. 2993*, *Can*; West arm of Cumsewa Inlet, Moresby Island, *Osgood* in 1900, *US 620084* (specimen with one good head of fruits).

Type collections.—"Queen Charlotte Islands, *Rev. J. H. Keen 10* in 1898. TYPE in the New York Botanical Garden." Type, *NY*, photograph *Pom-B*.

8 RANUNCULUS CALIFORNICUS Benth.

Hirsute to nearly glabrous terrestrial perennials; roots 1-1.5 mm. in diameter; stems erect or suberect or sometimes prostrate, not rooting, 3-7 or 8 dm.

long, 1.5-5 mm. in diameter, freely branching, commonly fistulous, commonly hirsute but sometimes glabrous; basal leaf blades compound or simple and 3-parted, mostly cordate, ovate, or orbicular in outline, 1.5-7 cm. long, 1.5-6 or rarely 9 cm. broad, nearly always pinnate with 3 or 5 leaflets, the lobes or leaflets again lobed or parted, appressed-hirsute to moderately pubescent, the petioles 5-25 cm. long, hirsute or rarely glabrous, the stipular leaf bases 2-4 cm. long; cauline leaves alternate, the bracts sometimes opposite, parted or divided, the upper sessile; pedicels 2-7 or 11 cm. long in flower, 4-14 cm. long in fruit, appressed-pubescent; sepals 5, yellowish-green, each reflexed at the middle, ovate, mucronate, 4-8 mm. long, 3-5 mm. broad, pilose dorsally, half as obovate, 11-13 mm. long, 3-4 or 7-8 mm. broad, mostly about twice as long as golden yellow, obovate-oblanceolate, 8-15 mm. long, 3-5 mm. broad, usually 2.5-3 times as long as broad, the claw 1-3 mm. long, the nectary scale glabrous, free practically its entire length, about 1 mm. long, truncate; stamens 30-60; achenes 5 or 10 or most commonly 20-35 (more numerous than in *R. occidentalis*) in an ovoid to subglobose head 5-8 mm. long and 6-8 mm. in diameter, each achene obovate to discoid, 1-2.8 mm. long, 1-2.3 mm. dorsoventrally, 0.5-0.7 mm. laterally, smooth or minutely reticulate, glabrous or rarely hispid, the margin noticeable, the beak rather stout, usually 0.4-0.8 mm. long, recurved; receptacle cylindroid, 1-2 mm. long in flower, 2-3 mm. long in fruit, glabrous or sometimes hispid.

8a RANUNCULUS CALIFORNICUS var. **typicus** nom. nov.*

R. Deppei Nutt. in Torr. & Gray, Fl. N. Amer. 1: 21. 1838, as syn. *R. dissectus* Hook. & Arn. Bot. Beech. Voy. 316. 1840, not Bieb. in 1819. *R. californicus* Benth. Pl. Hartw. 295. 1848. *R. californicus* var. *latilobus* A. Gray, Proc. Am. Acad. 21: 375. 1886. *R. latilobus* Parish, Pl. World 20: 214. 1917.

Vernally moist land of north slopes, meadows, fields, and rolling hills at low altitudes; largely in the California Oak Woodland but sometimes also in the Pacific Forest. Harbor, Curry County, Oregon; seaward Coast Ranges from Humboldt County, California, to Ensenada, Baja California; inland from San Francisco Bay to the Sierra Nevada foothills at Volcano and Ione in Amador County, between Sonora and Copperopolis in Calaveras County, and east of Madera. Oak woodland. Late January to May.

A form with the floral parts resembling vegetative leaves occurs in adobe soil in the San Francisco Bay Region. North Coast Range varieties of *R. occidentalis* and *R. canus* occasionally exhibit the same tendency.

Specimens of the form discussed above are as follows: CALIFORNIA: SAN MATEO CO. Redwood City, *L. Benson 2641, DS, Pom-B, UC, RM;* Woodside-Halfmoon Bay Road Jct. to California Sanitarium, *Wiggins 9719, DS, UC, RM, Wash;* Jasper Ridge, Stanford University, *Cohen 618, Pom-B.* CONTRA COSTA CO. Martinez, *Parry* in 1889, *Mo.* ALAMEDA CO. Hill back of the University of California, Berkeley, *Davy 6507, UC;* University of California grounds, *Gilbert* in 1896, *UC.*

Significant specimens.—OREGON: CURRY CO. Harbor, *Henderson 10203, UO.* CALIFORNIA: SACRAMENTO CO. 10 miles south of Sacramento, *L. Benson 4341, Pom-B.* AMADOR CO. Braunton *1264* in 1904, *Mo;* Ione, *Eastwood 10088 CAS;* Volcano, *Brandegee* in 1886, *UC.* SAN JOAQUIN CO. Stockton, *Stanford 119, DS, 1021, Pom;* Ripon, *Hoover 276, UC.* CALAVERAS CO. Sonora-Copperopolis Road, 1100 feet, *Ferris 1593, CAS, DS.* MERCED CO. Merced, *Brandegee* in 1890, *UC.* MADERA CO.

* Cf. Table 5.

11 miles east of Madera, *L. Benson 3045, Pom-B, DS, UC, RM.* FRESNO CO. Coalinga, *Munz 9179, Pom.*

BAJA CALIFORNIA: Alisitos, *Purer 7198, SD;* Between Tiajuana and Ensenada, *Epling & Stewart* in 1936, *Pom-B, DS;* Box canyon 23 miles north of Ensenada, *Wiggins 5155, DS, Pom-B, CAS, RM, Wash;* 16 miles north of Ensenada, *Peirson* in 1929, *Peirson 8243;* Ensenada, *M. E. Jones* in 1925, *Pom.*

Type collections.—(1.) *R. Deppei*, "*R. acris* (Linn.) . . . β. hairy; petals oblong, 10-14. —R. Deppei *Nutt.!* mss. . . . California, *Nuttall! June.*" Type (presumably), *PA;* isotype, *NY.* (2.) *R. dissectus*, "California-Supplement. Where not otherwise mentioned, it is to be understood that the following species are from the collection of Mr. Douglas. They were presented by the Horticultural Society of London, in whose service Mr. Douglas was at the time he gathered them." Type at Kew, photograph *DS:* isotypes, *NY, GH.* (3.) *R. californicus, Hartweg* "1628 (155). . . . R. dissectus, Hook. et Arn Bot. Beech. p. 316, non Bieb. — In sylvis prope Monterey," collected in 1846-7. Type at Kew, photograph *DS* (the lower plant, the upper one being var. *gratus!*); isotypes, *NY, GH*, photograph *Pom-B.* This is of the same peculiar dissected-leaved form as the plant upon which *R. dissectus* was based. No other collections of the species quite match these two type collections! (4.) Var. *latilobus*, "A common coarse-leaved and more robust form, *R. Ludovicianus* Greene, Bull. Calif. Adad. ii. 58." Greene, Fl. Fran. 300. 1892, wrote as follows: "Var. (4) latilobus, A. Gray, Proc. Am. Acad. xxi. 375 (1886), in part, excl. R. Ludovicianus. . . . Var. 4 is n. 374 of the State Survey from Santa Barbara." Gray's brief description throws no light on the subject, and he gave no indication that *Brewer 374*, Geological Survey of California, from Santa Barbara was the type of his variety. However, it is not likely that he had seen the type of *R. ludovicianus*, since none of the original material of it is at the Gray Herbarium. Furthermore, in the *Synoptical Flora of North America*, 1: 35. 1895, the variety *latilobus* is said by Robinson to be "a common form, especially southward, from San Francisco Bay to San Diego and San Bernardino," while *R. Ludovicianus* (now transferred to *R. canus* as a variety) is confined to fairly high elevations of the Temblor, Greenhorn, Tehachapi and San Bernardino Mountains in the interior. The description in the *Synoptical Flora* is too general to be of value in determining the identity of the variety. However, the material at the Gray Herbarium labelled for the *Synoptical Flora* as var. *latilobus* is definitely typical *R. californicus.* Since the *Synoptical Flora* label is on *Brewer 374*, the writer has accepted it as representative of the plants to which the name *latilobus* was given. Robinson was in a better position than anyone else to know what Gray intended although he did not necessarily know. *Brewer 374, GH*, is designated as a lectotype of var. *latilobus.* It is to be noted that Parish (*loc. cit.* 1917) took up the name *latilobus* as a specific epithet intended for *R. canus* var. *ludovicianus.* Otherwise interpretations have been generally the same as Greene's and Robinson's. Type, *GH*, photograph *Pom-B;* isotypes: *US 320372, 320373, UC 9412, 13931; Pom-B 268685.*

8b RANUNCULUS CALIFORNICUS var. GRATUS Jepson,*
Fl. W. Mid. Calif. 201. 1901

Wet banks and bottom land of deep canyons or moist north slopes in the Pacific Forest at the inner edge of the redwood belt. California North Coast Ranges from Humboldt County to Monterey and Napa counties. Late February to May.

This variety appears to pass into *Ranunculus occidentalis* var. *Eisenii* in Mendocino, Sonoma, and Napa counties and into *Ranunculus californicus* in Humboldt County and from Sonoma County southward. It is best developed in Sonoma and particularly Santa Clara counties, and the extreme form is differentiated strikingly from *Ranunculus californicus.* Segregation of the variety in Mendocino County and northward is difficult. The specimens from Monterey County are differentiated poorly from var. *typicus.*

* Cf. Table 5.

TABLE 5.—Varieties of *Ranunculus californicus* Benth.

Var. *typicus*	Var. *gratus*	Var. *cuneatus*	Var. *rugulosus*	Var. *austromontanus*
Hirsute to nearly glabrous, the hairs relatively firm.	Subglabrous or thinly pilose.	Moderately or sparsely hirsute or short-pubescent.	Nearly glabrous or the leaves appressed — pubescent.	Densely pilose-hirsute below, the hairs long and soft, capillary, spreading.
Stems erect or suberect, 3-6 or 8 dm. long, 1.5-5 mm. in diameter, usually fistulous, not tough.	Stems erect or reclining, 3-7 dm. long, 1.5-3 mm. in diameter, slightly fistulous, not tough.	Stems prostrate, only the pedicels assurgent, rarely rooting at the subterranean nodes, 1-2.5 dm. long, not ordinarily fistulous, tough.	Stems erect or suberect, 3-6 dm. long, 2-3 mm. in diameter, distinctly fistulous, rather delicate.	Stems decumbent below but ascending, 2-5 dm. long, 1.5-3 or rarely 4 mm. in diameter, somewhat fistulous, often slender.
Basal leaf blades commonly compound, rarely simple and 3-parted, mostly long-ovate or orbicular, 1.5-7 cm. broad, nearly always pinnate with 3 or 5 lobed or parted leaflets, thin, the ultimate lobes obtuse or acute, appressed-hirsute to moderately pubescent or rarely glabrous, the petioles 5-25 cm. long.	Basal leaf blades simple, broadly cordate or very broadly ovate in outline, 1.8 cm. long, 2.3-5 cm. broad, 3-parted or -lobed, the lobes again lobed, cuneate, thin, the ultimate lobes obtuse or acute, rather thinly pubescent, the petioles 7-15 or 25 cm. long.	Basal leaf blades simple, cordate-orbicular or cordate in outline, 1.5-4 cm. long, 2-6 cm. broad, 3-lobed to deeply 3-parted, the lobes again lobed or toothed, cuneate, the ultimate lobes rounded or obtuse, moderately pubescent, the petioles 3-12 cm. long.	Basal leaf blades simple or pinnate with 3 or 5 leaflets, ovate in outline or the bases cuneate, 2-7 cm. long, 2-6 or 9 cm. broad, deeply 3-parted or 3-5-divided and again once- or twice lobed or -cleft, the segments tending to be oblanceolate or sometimes narrowly cuneate, acute, the petioles 1 or commonly 2-3 dm. long.	Basal leaf blades simple, flabelliform in outline, the bases cuneate or rounded-cuneate, 3-4 cm. long, 3-4 cm. broad, deeply 3-parted, the parts usually 2-4-lobed, cuneate to oblanceolate, the petioles mostly 5-10 cm. long.
Petals 9-16 or 26, or rarely fewer, 8-15 mm. long, 3-5 mm. broad.	Petals 5-9 or 12, 3-10 mm. long, 2-5 mm. broad.	Petals as in var. *typicus*.	Petals 7-12, 7-11 mm. long, 3 mm. broad.	Petals mostly 7-12, 6-8 or sometimes 10 mm. long, 2-4 or rarely 5-6 mm. broad, the flowers small.

TABLE 5.—(*Continued.*)

Var. *typicus*	Var. *gratus*	Var. *cuneatus*	Var. *rugulosus*	Var. *austromontanus*
Achenes 5 or 15-35, obovate-discoid, 2- or usually 2.5-3 mm. long, 1.8- or usually 2-2.5 mm. dorsoventrally, the beaks rather stout, usually 0.4-0.8 mm. long, recurved.	Achenes 10-20, nearly discoid, 2.5 mm. long, 2 mm. broad, the beaks slender, 1-1.5 mm. long, recurved.	Achenes 20-30, like those of var. *typicus*.	Achenes 15-30, obovate, 1-2 mm. long, 1-1.5 mm. broad, the beaks usually slender, 0.7-0.8 mm. long, recurved.	Achenes mostly 10-20, obovate-discoid, 2-2.5 or rarely 3 mm. long, 1.6-2 or rarely 2.5 mm. dorsoventrally, the beaks 0.4-0.6 mm. long, apically recurved.
Coastal California; lower Sacramento Valley; Baja California.	Inner edge of the Redwood Belt, California.	Coastal Bluffs; Oregon and California.	In and about the San Joaquin Valley, California.	Mountains of San Bernardino, Riverside, and San Diego counties, California.

Specimens examined.—CALIFORNIA: HUMBOLDT CO. *Marshall* in 1888, *HGr;* Big Rock between Little River and Moonstone Beach, *Kildale 4266, DS;* Mouth of Little Riv-, *Kildale 1549, DS;* Eureka, *J. P. Tracy 11012, UC;* Humboldt Hill east of Field's Landing, *J. P. Tracy 1044, UC;* Kneeland Prairie, *Kildale 1585, DS;* Matole River near Petrolia, *J. P. Tracy 9965, UC;* Philipsville, South Fork of Eel River, *Kildale 2917, DS.* MENDOCINO CO. Noyo Inlet, *Heller 15328, DS, Ill, Mo, Clo* (this collection approaching var. *cuneatus*, however); South Mill Creek Canyon, Ukiah, *Abrams 6930, DS;* Old Highway, North of Cloverdale, *L. Benson 13, Pom-B.* SONOMA CO. Coverdale, *M. E. Jones* in 1924, *Pom;* Trenton, *Heller & Brown 5078, DS, Pom, Mo, RM, Wash, Ill;* Healdsburg, *Abrams 6906, DS;* Cazadero, *Bacigalupi 1372, DS;* Windsor, *Heller & Brown 5063, DS.* NAPA CO. 4 miles north of Calistoga, *L. Benson 2605, Pom-B;* Calistoga, *J. P. Tracy 1845, UC;* Stone Bridge Hill, Napa River Basin, *Jepson* in 1896, *UC, DS* (lectotype and isotype, cf. below); Hills east of St. Helena, *Jepson* in 1893, *UC* (probably closer to *R. occidentalis* var. *Eisenii*); Howell Mt. Grade, *Jepson* in 1896, *UC;* Caux's Knob, Napa River Basin, *Jepson* in 1893, *Ill;* Head of Dry Creek, *Greene* in 1895, *HGr 2727, 2728, and 2729* (apparently intergrading with *R. canus*, judging by the fruit). SAN MATEO CO. King's Mountain road from Woodside, *L. Benson 6251, Pom-B;* Searsville, Santa Cruz Mts., *Abrams 1148, DS, Pom.* SANTA CLARA CO. 8 miles northeast of Big Basin, *L. Benson 6445, Pom-B;* Stevens Creek, *L. Benson 2630, Pom-B, DS, UC;* Ravine above Congress Springs, *Dudley* in 1899, *DS;* Hacienda, *W. W. Price* in 1890, *US;* San Antonio Creek (Hidden Villa), *Dudley* in 1898, *DS;* Between Los Gatos and Saratoga, *Dudley* in 1893, *Pom, DS;* Raymond's Ranch near Los Gatos, *Newell* in 1914, *CAS;* Los Gatos, *Heller 7343, DS, Pom, UC, RM, Wash, Mo, US, Dudley* in 1893, *Pom, DS;* New Almaden, *Eastwood 14123, CAS;* Loma Prieta Peak, *Elmer 4661, CAS, DS, UC, Mo, US, Davy 421, UC, 480, UC.* MONTEREY CO. Monterey, *Hartweg 1628-(155)* in 1846-7 (in part), with type of *R. californicus* at Kew, photograph *DS, Greene* in 1895, *HGr, Heller 6530, NY, DS, UC, RM, Ill, Mo, Pom, Patterson & Witz 7-0* in 1907, *DS, Pom-B, Plaskett 22* in 1898, *NY;* Pacific Grove, *Abrams 4213, DS, L. Benson 6489, Pom-B;* Cypress Point, *L. Benson 6530, Pom-B.*

Type collection.—"Commonly in wooded country; hills of Napa Valley; Vaca Mountains." Four sheets at the Herbarium of the University of California are labelled *Ranunculus californicus* var. *gratus* in Jepson's handwriting. These are as follows; Hills east of St. Helena, Napa River Basin, *Jepson*, April 24, 1893. This plant, however, approaches *R. occidentalis* var. *Eisenii*. Of the seven flowers on the same individual, six have five petals and one has seven petals. Another collection is from Howell Mountain Grade, Napa River Basin, *Jepson*, February 22, 1896. A third collection occupies the other two sheets, and these two sheets taken together are designated as a lectotype. This collection is as follows: Stone Bridge Hill, Napa River Basin, *Willis L. Jepson*, Feb. 22, 1896, *UC 9499 and 9501* (lectotype); isotype *DS 96465*. The specimens best representing the extreme form of the variety are the following ones from the Santa Cruz Mountains (cited also in more detail above): Los Gatos, *Heller 7343;* Stevens Creek, *L. Benson 2630;* Between Los Gatos and Saratoga, *Dudley* in 1893; Los Gatos *Dudley* in 1893. However, Jepson's collections from the hills near Napa Valley approach these in differentiation from var. *typicus*.

8c RANUNCULUS CALIFORNICUS var. CUNEATUS Greene,* Fl. Fran. 299. 1892

(Liberal policy: specific rank)

R. californicus var. *crassifolius* Greene, Erythea 1: 125. 1893.

Barren sea bluffs; Sauvies Island, Columbia River, Oregon, to Monterey County in Northern California, and on Santa Maria, San Miguel, and Santa Cruz Islands in Southern California.

Oregon specimens tend toward 5 petals and compound leaves. They are

* Cf. Table 5.

related as closely to *Ranunculus occidentalis* as to *Ranunculus californicus*. May and June.

Specimens examined.—OREGON: CLATSOP CO. (?) Sauvies Island, *J. Howell* in 1885, *UO*. LINCOLN CO. Devils Lake, *Gorman 7561, UO;* Newport, *Peck 6409, WillU*. COUNTY UNCERTAIN. Grants, *Howell 20B* in 1888, *UO*. Bandon Beach, *Abrams & G. T. Benson 10576, DS*. CURRY CO. Cape Blanco, *Henderson 11732, UO*. CALIFORNIA: DEL NORTE CO. Castle Island, Cresent City, *Kelley* in 1924, *CAS*. MENDOCINO CO. *Eastwood & Howell 2543, CAS;* Ft. Bragg, *Heller 15327* (topotype of var. *crassifolius*, cf. below), *DS, Clo, Wash, Ill, Mo, Pom*. SONOMA CO. Bodega Point, *Eastwood 4811, CAS;* North of Bodega Bay, *Eastwood & Howell 7369, CAS;* Bodega Bay, *Heller 15082, DS, Wash, Ill, Pom, WSC, Mo, L. S. Rose 39031* in 1939, *Wash, GH* (39051 on this sheet), *Mo, Clo*. MARIN CO. Dillons Beach, *J. T. Howell 21693, CAS;* Tomales Ridge, *Schreiber 2126, DS, UC* (leaves somewhat dissected); Point Reyes, *Abrams 11603, DS, Eastwood 11794, CAS, J. T. Howell 15501, CAS, 21684, CAS, 21694, CAS*. SAN FRANCISCO CO. San Francisco, *Walker in 1906, UC;* Pt. Lobos, San Francisco, *Brandegee* in 1892, *UC, Setchell* (*UC* Exsiccatae) *93* in 1909 and 1910, *DS, Pom, UC, RM, Mo;* Bakers Beach Tunnel, San Francisco, *Dudley* in 1902, *DS;* Lands End, *Fossler* in 1902, *UC;* Twin Peaks, *L. S. Rose 39036* in 1939, *Wash, GH*. SAN MATEO CO. Moss Beach, *L. Benson 1947, Pom-B, 2618, Pom-B;* Martins Beach, *L. Benson 6257, Pom-B;* San Gregorio, *C. F. Baker 504* in 1902, *Pom, NY, UC, Mo*. MONTEREY CO. Pacific Grove, *Elmer 3526, Pom, DS, UC, Mo;* Between Pacific Grove and lighthouse, *J. D. Randall* in 1911, *DS, Pom;* Cypress Point, *J. D. Randall* in 1910, *DS, Eastwood 67, CAS, J. D. Randall* in 1911, *DS, Ewan 9118 Pom;* Pt. Lobos, *K. Brandegee* in 1891, *RM;* Carmel, *Epling 6050, Mo, 6223, Mo, Hollis* (Epling's number) *6269, Mo*. SANTA BARBARA CO. San Miguel Island, *Munz & Norris 11880. Pom. Hoffman* in 1932, *SBM;* Prisoner's Harbor, Santa Cruz Island, *Hoffman* in 1932, *SBM;* Willow Creek, Santa Cruz Island, *Hoffman* in 1932, *SBM;* Cuyler's, Santa Maria Island, *Hoffman* in 1932, *Pom-B, SBM*.

Type collections.—(1.) Var. *cuneatus*, "Var. 3 is confined to the wet meadows that lie back of the ocean in San Mateo Co., doubtlessly also reaching San Francisco Co. In cultivation at Berkeley it behaves unlike the other forms, is almost annual, *i. e.* many individuals come to flowering the first year from seed, and die before the end of the year. Other individuals are of perennial duration." No type was found by the writer at the Herbarium Greeneanum, University of Notre Dame. (2.) Var. *crassifolius*, "Collected at Fort Bragg, Mendocino Co., Calif., By Mr. Michener." The type of this variety also was not located at the Herbarium Greeneanum, and the writer has seen no isotype. Recently a topotype has been collected. It is as follows: 1 mile north of Fort Bragg, *Heller 15327, DS, Ill, Clo, Wash, Mo, Pom*. Two specimens from cultivation by Greene at Berkeley are labelled as var. *crassifolius*. These were pressed in 1893 (*UC 9409*) and 1894 (*UC 9408*). It is possible that these represent the stock upon which var. *crassifolius* was based. However, Greene mentions cultivation of only his var. *cuneatus*, and it is possible that these are the stock from which the description of that variety was drawn.

8d RANUNCULUS CALIFORNICUS var. RUGULOSUS (Greene) L. Benson,* Amer. Jour. Bot. 23: 30. 1936

(Liberal policy: *R. rugulosus* Greene)

R. rugulosus Greene, Pittonia 2: 58. 1890.

Wet sands of rivers and ditches mostly in the Great Valley of California up to 3,000 feet elevation; along and within the lower edge of the California Oak Woodland but chiefly the Pacific Grassland. California in tule land in the Sacramento Valley in Colusa, Sutter, and Sacramento counties and in

* Cf. Table 5.

the San Joaquin Valley from western Merced County to Kings and Tulare counties, and in lower Sierra Nevada foothills fom Tuolumne County to Mariposa County; possibly in Kern County. March to May.

Specimens examined.—CALIFORNIA: COLUSA COUNTY. Sycamore Slough, *Ferris 612, DS, Mo;* abandoned rice field 2 miles west of Colusa, *Ferris 6296, DS, Pom.* SUTTER CO. Edge of tule land, *Copeland 3267, Pom.* SACRAMENTO CO. American Basin, *Ramaley 11127, UC.* MERCED CO. San Joaquin River bridge east of Los Banos, *Abrams 10761, DS, Clo, Pom.* TUOLUMNE CO. Jamestown, *Abrams 10018, DS;* Lower Hetch-Hetchy Valley, *Jepson 3460, J;* Hog Ranch, Mather, *Hall & Babcock 3371, RM, UC.* MARIPOSA CO. Yosemite Valley, *Purer* in 1932, *SD;* Chowchilla Mts., *McLean in 1875, HGr* (type), photograph *DS;* Mormon Bar, *Congdon in 1896, DS, UC;* Agua Fria, *Congdon* in 1895, *DS.* MADERA CO. East of dam on San Joaquin River northeast of Mendota, *Dudley* in 1903, *DS.* FRESNO CO. Piedra, *Duncan 33, DS;* Kings River Delta area near Centerville, *Quibell 576, Pom;* Sanger, *Condit* in 1910, *UC.* Kings River at Kingsburg, *C. Johnson 35* in 1933, *Pom-B, RM, DS, UC.* TULARE CO. Goshen Junction, *L. Benson 3330, Pom-B, RM, 3574, Pom-B, DS, UC;* Visalia, *Patterson* in 1886, *HGr;* 5 miles from Visalia, *Musick* in 1936, *Wash;* 6 miles east of Visalia, *L. Benson 7548, Pom-B;* Lemon Cove, *Morgan* in 1932, *Pom-B;* Tulare, *Davy 3108, UC;* Kaweah River 18 miles southeast of Visalia, *Woolsey* in 1898, *UC;* Porterville, *Stringham* in 1932, *Pom-B;* Tule River, *Munz 9145, Pom, UC;* Springville, *Peirson* in 1925, *Peirson 5608.* KERN CO. West of Bakersfield, *A. & R. Nelson 543, DS, RM.* This collection is a poor one, and determination is not certain. It is possible that this variety may occur along Kern River or its system of ditches, although during seven years at Bakersfield the writer did not find the plant. Introduction with crop seeds from Tulare County would not be difficult.

Type collections.—"The type of this species is a very slender but tall plant from the Chowchilla Mountains in the eastern part of south-central California, where it was collected in 1875 by Mr. F. P. McLean." The "Chowchilla Mountains" are a ridge in the Sierra Nevada west of Wawona, Yosemite National Park. The type is *HGr 2799*, photograph *DS.*

8e **Ranunculus californicus** var. **austromontanus** L. Benson, var. nov.*

Herba perennis terrestris pilosa-hirsuta; caulibus 2-5 dm. longis, 1.5-2.3 mm. diametro; foliis flabelliformis, in segmenta cuneata vel oblanceolata; petalis 7-12, 6-8 raro 10 mm. longis, 2-4 raro 5-6 mm. latis; acheniis 10-20 obovoidis-discoidis, 2-2.5 raro 3 mm. longis, 1.6-2 raro 2.5 mm. latis, rostro curvato, 0.4-0.6 mm. longo.

Mountain meadows at 4,000 to 7,500 feet elevation; upper portion of the California Oak Woodland or mostly in the Sierran Forest. San Bernardino Mountains (where it intergrades with *R. canus* var. *ludovicianus*); San Jacinto Mountains and southward to San Diego County, California. Late May until July.

This variety is as much related to *R. canus* var. *ludovicianus* as to *R. californicus*, and it forms one of the several connecting links between the species *canus* and *californicus*. Distinction of the species is based primarily upon the fruit size, this being the most reliable character though by no means the only one. The small-fruited var. *austromontanus* has been included by some authors in *R. californicus* var. *typicus* and by some in var. *ludovicianus* taken as a variety of *R. californicus*.

In various herbaria there are a few plants with only 5-6 or sometimes 7

* Cf. Table 5.

petals collected in San Diego County, California, and several recent collections of this type are in the Museum of the San Diego Society of Natural History. Vegetatively these fall chiefly within the range of characters of *R. californicus* var. *austromontanus*, which resembles sometimes more or less *R. occidentalis* var. *ultramontanus*, but a few collections are similar to *R. occidentalis* var. *Eisenii*. That these specimens are not from outlying southern populations of these varieties of *R. occidentalis* is shown clearly by the fruit, which is definitely of the type in *R. californicus* var. *austromontanus*. In particular, the achene beaks are much shorter than in any of the varieties of *R. occidentalis*. Although the gene or genes for production of fewer petals may have survived in this population from interbreeding with an earlier southward extension of the range of *R. occidentalis* var. *Eisenii* or more likely var. *ultramontanus*, which has more similar fruit, it seems probable that in this case it has arisen independently in a population of *R. californicus* var. *austromontanus*. On Mt. Palomar, the writer found an extensive population of 5-6 petalled plants completely isolated from the multipetalous types.

Specimens of the plant discussed above are as follows: Mt. Palomar, midway between Crestline and the Observatory, *L. Benson 12600, Pom* (14 other sheets to be distributed); Palomar Mountain, *Parish 4403, Mo* (in part on one sheet, wholly on the other) (not *DS*), *Huey & Higgins* in 1945, *SD;* Doane Valley, Mt. Palomar, *Gander* in 1940, *SD;* Santa Ysabel, *Henshaw 200, NR;* Julian, *J. D. Randall* in 1914, *DS, Pom;* Pine Hills, Julian, *Spencer 493, NY* (not *Pom*); Cuyamaca, *Harbison* in 1940, *SD;* Rattlesnake Valley, *Gander 5843, SD;* Laguna Camp, Laguna Mts., *Munz 9705, DS, Pom* (with 7-8 petals in the middle plant of the sheet, *88464*), *Sanford* in 1927, CAS; Laguna Lake, *Purer 5805, SD;* near Shrine Camp, Laguna Mts., Gander 5614, *SD;* Laguna Mts., *Scarbery* in 1937, *SD.*

Specimens examined.—CALIFORNIA: SAN BERNARDINO CO. (San Bernardino Mountains). Bear Valley, *M. E. Jones 6144* in 1900, *Pom*, in 1924, *UC, H. M. Hall, 1032, UC;* Fawnskin, *Chandler* in 1897, *UC;* City Creek Grade, *M. E. Jones* in 1926. *Pom;* Bluff Lake, *Munz 10437, Pom, UC, J. Grinnell 79 UC, Johnston* in 1924, *GH, Pom, Goodman & Hitchcock 1781 Ill, Mo, C. B. Wolf 8043, WSC.* RIVERSIDE CO. (San Jacinto Mountains). Picos, San Jacinto Valley, *H. M. Hall 435, UC;* Saunders Meadow, San Jacinto Mts., *C. V. Meyer 196, UC;* San Jacinto Peak, *Hart* in 1922, *CAS;* below Kenworthy, *Munz & Johnston 5462, Pom;* Coahuila, *H. M. Hall 2889, UC;* Coahuilla Valley, *Munz 10892, Pom.* SAN DIEGO CO. Dyche Valley, Palomar Mts., *Jaeger* in 1925, *Pom;* Palomar Mt., *Parish 4403, DS, Mo* (mostly with 5-6 petals); Palomar, *Peirson* in 1924, *Peirson 4794;* Palomar Mts., *Munz 8264, Pom;* Morgan Hill, Palomar, *Peirson* in 1920, *Peirson 2660;* French Valley, Palomar, *H. M. Hall 1943, UC;* San Marcos Valley, *Orcutt 4* in 1891, *Mo;* Santa Ysabel, *R. B. Randall 125* in 19[illegible], *SD;* Warner Hot Springs, *Eastwood 2839, CAS;* Witch Creek, *Alderson 92, DS, HGr, UC, PA;* Julian, *Cleveland* in 1881, *SD, Abrams 13884, DS, Wash, M. E. Jones* in 1906, *Pom;* Pine Hills, Julian *Spencer 493, Pom, NY* (5 petals), *Gander 1752, SD;* Julian to Cuyamaca Lake, *Woodcock* in 1928, *SD;* Upper Cuyama Valley, *Purer 6510, DS, SD, Mo* (intergrade to var. *typicus*); Cuyamaca Mts., *Orcutt 468* in 1899, *Mo, H. M. Hall* in 1899, *UC;* Cuyamaca Valley, *Cleveland* in 1877, *SD;* Cuyamaca Lake, *M. E. Jones* in 1926, *GH, Munz 9782, Pom, Munz & Harwood 7239, Pom, V. Miller* in 1924, *UC, McGregor* in 1918, *DS* (but not the collection from 3 miles south of Cuyamaca Lake), *Wiggins 2034, DS, Abrams 3881, DS, Stevens* in 1926, *SD, Gander 206* in 1935, *SD;* Laguna Mts., *Brandegee* in 1904, *UC, Mearns & Schoenfeldt 3590, DS, Sanford* in 1927, *CAS, Spencer*, [illegible] collections in 1933, *SD, Gander 1765, SD;* Mountain Springs Grade, *Orcutt* [illegible] *UC;* La Costa, *Alderson 1881, DS;* Chat, *M. E. Jones* in 1897 (presumably San Diego Co., but the diary for 1897 not located), *Pom;* Corte Madera Rancho, *Harbison & Higgins 215* in 1944, *SD.*

Type collection.—Meadow, Coahuila Valley, 4,500 feet, Riverside County, California, *Philip A. Munz 10892*, May 21, 1927, *Pom 157894* (type).

9 RANUNCULUS CANUS Benth.

Hirsute or villous terrestrial perennials; roots 1-1.5 mm. in diameter; stems erect, suberect, or decumbent (more robust than in *R. occidentalis* and *R. californicus*), not rooting, 2.5-9 dm. long, 3-7 mm. in diameter, freely branching, fistulous below, hirsute; basal leaf blades simple or compound, ovate or broadly so in outline, 2-8 cm. broad, 3-cleft or -parted or pinnate with 3 or rarely 5 leaflets, each leaflet proximally cuneate and distally rounded, parted and lobed, the ultimate lobes acute, appressed-pubescent but distinctly green in most forms, the petioles 5-12 cm. long, often densely pilose, the stipular leaf bases 2-3 cm. long, 5 to 10 mm. broad; cauline leaves alternate, the bracts of 1-3 elongated lobes, sessile; pedicels 2-7 cm. long in flower, 3-12 cm. long in fruit, densely appressed-pubescent; sepals 5, greenish-yellow, each reflexed at the middle, ovate-acute, 5-7 mm. long, 3-4 mm. broad, densely pubescent dorsally, half the length of the petals, promptly deciduous; petals 5-23, bright golden yellow, elliptic to orbicular, 1-2 or 3 times as long as broad, 10-14 mm. long, 3-7 mm. broad, the claw often 4-5 mm. long, the nectary scale glabrous, free for three-fourths of its length, about 1 mm. long, truncate; stamens 40-70; achenes 12-30 in a hemispheroidal to subglobose head 7-8 mm. long and 8-10 mm. in diameter, each achene discoid or cuneate to obovate, usually 4-5 mm. long, 3-4.5 mm. dorsoventrally, 0.2-0.5 mm. laterally, smooth, glabrous or pubescent, the margin prominent in thin forms and inconspicuous in thick forms, the beak deltoid, 0.3-0.6 or 1 mm. long, 0.6-1 mm. broad at the base, recurved at the tip; receptacle globose, 1 mm. long in flower, 1.5 mm. long in fruit, glabrous.

9a RANUNCULUS CANUS var. **typicus,** nom. nov.

R. canus Benth. Pl. Hartw. 294. 1848. *R. occidentalis* Nutt. var. *canus* A. Gray, Proc. Amer. Acad. 8: 374. 1872. *R. californicus* Benth. var. *canus* Brew. & Wats. Bot. Calif. 1: 8. 1876. *R. canus* var. *Blankinshipii* Rob. in A. Gray, Syn. Fl. N. Amer. 1: 35. 1895. *R. Blankinshipii* Heller, Muhlenbergia 1: 40. 1904. *R. longilobus* Heller, Muhlenbergia 2: 36. 1905.

Hirsute; stems erect or suberect, 4-9 dm. long, 3-7 mm. in diameter; basal leaf blades simple or compound, ovate in outline, 5-8 cm. long, 5-8 cm. broad, 3-parted or pinnate with 3 or rarely 5 leaflets, each leaflet proximally cuneate and distally rounded, parted or lobed, the ultimate lobes acute, appressed-pubescent but distinctly green; petals 5-10, 1-2 times as long as broad, the claws often 4-5 mm. long, 11-14 mm. long, 5-7 mm. broad, 1.5-2 times as long as broad; achenes 12-20, thick or thin, discoid, 4-5 mm. long, 3-4.5 mm. dorsoventrally, glabrous or pubescent, the margins conspicuous in thin forms and inconspicuous in thick forms.

Heavy soils of hills and valleys at 50-1,000 feet elevation in the California Oak Woodland and (primarily) the Pacific Grassland. California in the inner Coast Ranges from Tehema County to the Mt. Diablo Range, in the Sacramento Valley, in the lower Sierra Nevada foothills (below the oak belt)

from Butte County to Tuolumne County, and in the San Joaquin Valley in San Joaquin County and at Merced and Lindsay. Late February to early April.

The name *Ranunculus canus* is applied to the plants of the *Ranunculus occidentalis* complex having fruit 4-5 mm. long. These form essentially a natural group. In the Coast Ranges and the Sierra Nevada foothills it is not unusual to find on the same plant the large fruit of *Ranunculus canus* and the (usually) simple relatively small leaves of *Ranunculus occidentalis* var. *Eisenii*, which grows at higher elevations in both ranges or at stations more remote from the Sacramento Valley than does *Ranunculus canus*. This form has been named *Ranunculus canus* var. *Blankinshipii*.

Representative specimens of this plant are as follows: TEHEMA CO. Stivers Ranch, *Jepson* in 1899, *J.* COLUSA CO. Grade east of Leesville, *Heller 13113, DS, Ill, GH, Mo, PA* (this individual resembling var. *laetus*, however). YOLO CO. Capay, *Blankinship* in 1893, *GH*, photographs *DS* and *Pom-B*, *UC* (type and isotypes of var. *Blankinshipii*, cf. below). NAPA CO. Napa Valley, *Jepson* in 1893, *UC 9420*. BUTTE CO. Above Oroville, *Heller 10705, DS*. PLACER CO. Colfax, *Greene* in 1888, *HGr*.

Specimens examined.—CALIFORNIA: SHASTA CO. Middle Creek Station, Keswick, *Heller 7912, CAS, NY, US, DS, GH, PA* (type and isotypes of *R. longilobus*, cf. below), *13930, NY, DS, UC, RM, Wash, GH, WSC, Mo* (cf. discussion under type collections); north of Redding, *Heller 15568, WSC, Wash;* 3 miles north of Redding, *L. Wheeler 3408, Mo;* McArthur, *C. L. Hitchcock 6633, Wash;* Cottonwood, *L. E. Smith 178, CAS*. TEHEMA CO. South of Red Bluff, *L. Benson 1057, Pom-B*. Pine Creek, *Heller 11335, UC, Ill, CAS*. COLUSA CO. Arbuckle-Rumsey, *Ferris 560, DS*. GLENN CO. Willows, *Heller 16412, Wash*. BUTTE CO. *Austin* in 1883, *HGr*, in 1898, *Pom*, *Bruce* in 1897, *Pom;* Clear Creek, *H. E. Brown 180, DS;* 12 miles north of Chico, *Heller 11336, HGr, DS, Mo, Wash, CAS, RM;* 10 miles north of Chico, *Heller 16412, Wash;* 11 miles north of Chico, *F. G. Meyer 1341, WSC;* Chico, *Austin* in 1896, *HGr, UC*, (tending toward var. *laetus*), *217* in 1896, *Mo;* Rock Creek west of Chico, *Heller 11771, Clo, Ill;* Nelson, *Heller & Brown 5444, DS, Mo, 5449, Pom, 13916, DS, Pom-B, UC, Mo, RM, Wash, WSC, CAS;* between Durham and Nelson, *Heller 11393, HGr, DS, Mo, PA, UC, Clo, Wash, Ill;* 5 miles northwest of Oroville, *L. Benson 6368, Pom-B* (probably the recent collection nearest to the exact type station); north of Oroville, *Heller 10727, DS, UC, Mo*. SUTTER CO. East of Marysville Buttes, *L. Benson 6354, Pom-B*. YOLO CO. Woodland, *Brandegee* in 1893, *UC*. SACRAMENTO CO. Folsom, *L. Benson 1946, Pom-B* (tending toward *R. californicus*). ELDORADO CO. *Curran* in 1884, *UC*. SOLANO CO. Araquipa Hills, *Jepson* in 1891, *UC*. CONTRA COSTA CO. Mitchell Canyon, Mt. Diablo near Clayton, *L. Benson 6275, Pom-B;* Sycamore Canyon, Mt. Diablo, *Bowerman 587, Pom-B, UC;* San Ramon, *Davy* in 1898, *Pom;* Danville, *L. Benson 2654, Pom-B, RM, 2655, Pom-B, UC, RM, Ill*. CALAVERAS (?) CO. Salt Springs Valley, *J. P. Tracy 5668, UC*. MERCED CO. Merced, *Brandegee* in 1890, *UC*. TULARE CO. Lindsay, *Harter* in 1928, *CAS, UC*.

Type collections.—(1.) *R. canus*, "In pascuis humidis vallis Sacramento ubi terram late obtegit." *Hartweg 1626 (239)* in 1847. Jepson, Erythea 5: 54. 1897, quotes the following from Hartweg: "On April the 13, I left [the junction of the Yuba and Feather Rivers] with Mr. L. for his farm, seventy miles higher up the valley. . . . Crossing Feather River, which here is eighty yards broad, and of considerable depth, our course lay five and twenty miles along that river, through a beautiful wood of evergreen and deciduous oaks. . . . Leaving Feather River we struck across a prairie for twenty miles; here immense fields of Eschscholtzia crocea, E. californica and Ranunculus No. 239, presented themselves, each species growing by itself." The junction of the Yuba and Feather Rivers is at the present town of Marysville; Oroville is 26 miles up the Feather River; Chico is 21 miles northwest of Oroville. The country between Oroville and Chico is treeless grassland. The type station for *Ranunculus canus*, therefore, must be between Oroville and Chico. A few collectors have obtained the species on the plains and foothills between the towns in recent years. Type, Royal

Botanic Gardens, Kew, England, photograph *DS;* isotypes *NY, GH,* photograph *Pom-B.* (2.) Var. *Blankinshipii,* "Capay, Yolo County, Calif., J. W. Blankinship. 15 April, 1893." Type, *GH,* photographs *DS* and *Pom-B;* isotype, *UC 118180.* (3.) *R. longilobus,* "The type is[*Heller*] no 7912, collected May 31, 1905 on hills about one mile back from Middle Creek Station near Keswick, Shasta County, California, growing in damp ground near a little stream." This plant is intermediate in vegetative characters between *R. occidentalis* vars. *Eisenii* and *ultramontanus,* and both the type collection and a specially-collected topotype (*Heller 13930*) show fruit on some specimen sheets of the *R. canus* type and on others of the *R. occidentalis* var. *Eisenii* type. While *R. longilobus* is placed in synonymy under *R. canus,* the type is by no means identical with that species. The Middle Creek Station plants seem to represent a local variable population derived by recombination of characters of *R. canus* and *R. occidentalis* vars. *Eisenii* and *ultramontanus.* It is doubtful if the population is sufficiently homogeneous and consistently differentiated to be considered as a separate variety. However, this point might be determined by intensive field work at and near the type locality. Herbarium specimens are inadequate for such a study. Type, *CAS 57722 and 57723* (cf. note on season's collecting, Muhlenbergia 2: 1. 1905, the types of the season's collecting being deposited at the California Academy of Sciences) (older fruit like *R. canus,* the younger giving the erroneous impression of being that of *R. occidentalis* var. *Eisenii*); isotypes, *NY* (fruit of *canus*), *US 611014* (fruit of *Eisenii*), *DS 95764* (fruit of *Eisenii*), *GH* (fruit of *Eisenii*), *PA 518549* (fruit of *canus*). Topotypes collected at Keswick, *Heller 13930* (fruit of *canus*), *NY, DS, UC, RM, Wash, GH* (fruit rather small), *Mo, Pom.*

9b RANUNCULUS CANUS var. LAETUS (Greene) L. Benson, Bull. Torrey Club 68: 170. 1941

R. californicus Benth var. *laetus* Greene Fl. Fran. 299. 1892. *R. californicus* var. *canescens* Greene, Fl. Fran. 299. 1892. *R. hesperoxys* Greene, Erythea 2: 189. 1894. *R. canus* var. *hesperoxys* Davis, Minn. Bot. Studies 2: 475. 1900.

Basal leaf blades compound and the leaflets dissected into segments 4-8 mm. broad, usually appressed-silky dorsally and green ventrally; otherwise like var. *typicus.*

Heavy adobe soil on north slopes of foothills in the California Oak Woodland or mostly along the borders of the Pacific Grassland. California on the Marysville Buttes, at Woodland, in the Vaca Mountains, in the Mt. Diablo Range, and in the San Joaquin Valley near Stockton. March and early April.

Forms intermediate between this and var. *typicus* occur in the Sacramento Valley. West and south of the Mt. Diablo Range, and to some extent in the Range itself, the leaf form of var. *laetus* is found combined with the characteristics (small fruit and 9-16 narrower petals) of *Ranunculus californicus.*

Specimens examined.—CALIFORNIA: SUTTER CO. Marysville Buttes, *L. Benson 6352, Pom-B, Heller 16075, Mo.* COLUSA CO. Arbuckle to Rumsey, *Ferris 560, DS.* YOLO CO. Woodland, *Blankinship* in 1893, *GH.* NAPA CO. Gordon Valley, *Greene* in 1886, *HGr.* SOLANO CO. Suisun, *Greene* in 1885, *HGr, UC,* in 1886, *US,* in 1890, *HGr, US* (type and isotypes, cf. below), in 1895, *UC; Vanden* (Solano Co. ?), *Jepson* in 1896, *DS, Mo.* CONTRA COSTA CO. Antioch, *Greene* in 1887, *HGr, GH, UC* (type and isotype of *R. hesperoxys,* cf. below), in 1895, *HGr, UC, Davy 915, HGr, UC, 925, Pom-B, K. Brandegee* in 1889, *GH, Heller 8905, NY, GH, DS, Wash, Mo, PA, Ill;* 3 miles south of Antioch, *L. Benson 6281, Pom-B;* Mitchell Canyon, Mt. Diablo above Clayton, *L. Benson 6272, Pom-B, 6273, Pom-B, 6275, Pom-B, 6276, Pom-B, Bowerman 563, Pom-B;* Mt. Diablo, *Greene* in 1886, *HGr,*

US; near Livermore, Greene in 1889, *HGr, US* (lectotype and isotype of var. *canescens*, cf. below); Tesla Road near Livermore, *J. T. Howell 10876, CAS;* Altamont Pass, *L. Benson 2632, Pom-B, DS, UC, RM;* Altamont, *Stanford 791, DS, Mo.* SAN JOAQUIN CO. *Stanford, DS;* Stockton, *Greene* in 1889, *HGr;* Knights Ferry, *Bancroft* in 1895, *J, HGr, UC.*

Type collections.—(1.) Var. *laetus*, "Var. 1 is of the interior, about Suisun . . . occupying low meadow lands adjacent to brackish marshes." Greene's specimen collected at Suisun on May 4, 1890 has been designated as a lectotype (*HGr 2542*), cf. L. Benson, Bull. Torrey Club 68: 171. 1941; isotype *US 1391412.* (2.) Var. *canescens*, "Var. 2 belongs to middle elevations of the Mt. Diablo Range and the valleys among them, from Niles to the hills east of Livermore, thence southward to San Luis Obispo County. It was in part my *R. Ludovicianus.*" A collection from Mt. Diablo, Greene in 1886 is *US 1147.* The following specimens are at the Herbarium Greeneanum: near Livermore, Greene, March 9, 1889 (lectotype, *HGr 2528-9;* isotype, *US 1161*); Paso Robles, C. C. Parry in 1888 (*HGr 2527*). There is no material from Niles, and the Livermore specimen has been designated as a lectotype cf. L. Benson, *loc. cit.* The Parry specimen is densely hairy like var. *laetus*, but the fruit and flower characters place it in *R. californicus.* (3.) *R. hesperoxys*, "This is the plant, which in the *Flora Franciscana* and in the *Manual*, I called *R. canus*, for the reason that it seemed to come nearer the description of that species than any other plant known to occur in the region whence Mr. Bentham had his type. But having now seen that type, I am prepared to assert that *R. canus* has not yet been rediscovered. Nothing at all resembling Hartweg's plant is known to Californian botanists of the present time." In *Flora Franciscana* (301. 1892) *R. canus* is said to occur on "Plains and hills of the interior, especially about Antioch, and northward to Chico, Mrs. Bidwell." The following specimen has been designated as a lectotype cf. *R. hesperoxys;* Antioch, *Greene*, April 16, 1887 (*HGr 2615*), cf. L. Benson, *loc. cit.* Isotype, *US 135556.*

9c RANUNCULUS CANUS var. LUDOVICIANUS (Greene) L. Benson, Bull. Torey Club 68: 171. 1941
(Liberal policy: *R. ludovicanus* Greene)

R. ludovicianus Greene, Bull. Calif. Acad. 2: 58. 1886. *R. Californicus* var. *ludovicianus* Davis, Minn. Bot. Studies 2: 476. 1900.

Densely hirsute or villous, the hairs spreading, except on the leaves; stems usually decumbent below, 2.5-4.5 dm. long, 3-5 mm. in diameter; basal leaf blades commonly simple, ovate or broadly so, 2-5 cm. long, 2-5 cm. broad, deeply 3-parted or -cleft, the lobes again lobed, usually cuneate, densely appressed-hirsute; petals 10-23, 10-13 mm. long, 3-5 mm. broad, 2-3 times as long as broad; achenes 20-30, thick, each cuneate or sometimes ovate, usually 4-5 mm. long, 3 mm. broad.

Moist ground of vernal meadows or rivulets or mountain streams at 3,300-7,500 feet elevation in the Sierran Forest or the California Oak Woodland. California in the San Emigdio, Greenhorn, Tehachapi, and San Bernardino Mountains; Kern and San Bernardino counties. Late March to May.

Specimens examined.—CALIFORNIA: KERN CO. Greenhorn Mountains, *Palmer 102, NY;* Havilah, *Weston 95, NR;* Ft. Tejon, San Emigdio Mountains, *Parish 1990, DS, HGr, Davy 2361, UC, Abrams 11675, DS, Pom;* Water Canyon, Tehachapi Mountains, 7000 feet, *Abrams & McGregor 487 DS, Pom;* Castaic Lake, Tejon Pass, Tehachapi Mountains, *Dudley & Lamb 4468, DS;* Tejon Canyon, Tehachapi Mountains, *L. Benson 4301, Pom-B, UC;* Keene and Tehachapi Valley, numerous collectors. SAN BERNARDINO CO. It is to be noted that in the San Bernardino Mountains *R. californicus* var. *austromontanus* intergrades with var. *ludovicianus.* Size of fruit is the most reliable distinguishing character. San Bernardino Mountains, 5,000 feet, *Parish 5804, RM, Van Dyke* in 1928, *CAS;* Bear Valley, *Parish 1785, DS, 3033, PA, HGr, Mo, 3691, HGr, UC, 4949 DS, 19285, DS, S. B. & W. F. Parish 1582, Mo* (fruit small

for this variety), *PA, H. M. Hall 1032, UC, 1338, Mo, M. E. Jones 6144, NR, Leiberg 3313, US, Pierce* in 1922, *Pom, McGregor 137* in 1941, *DS, Harwood 4322, Pom, 4323, Pom, McCall 5864, Pom-B;* Big Bear Lake, *J. T. Howell 2731, CAS;* south side of Big Bear Lake, *L. Benson 11545, Pom-B;* City Creek Grade, *M. E. Jones* in 1926, *DS;* Bluff Lake, *Munz 5624, Pom, Hilend 486, CAS.*

Type collections.—(1.) *R. ludovicianus*, "High valleys among the mountains of San Luis Obispo County, California, and eastward to Tehachapi Pass. Collected by Mrs. Curran, in 1884." Neither the Brandegee Collection at the University of California nor the Herbarium Greeneanum at the University of Notre Dame contains a specimen collected by Mrs. Curran [Brandegee] in San Luis Obispo County, and apparently no specimen of this variety has been collected in San Luis Obispo County at any other time. The epithet *ludovicianus* has been applied constantly to the common many-petalled plant growing in the Tehachapi Mountains, and, in absence of a type, the 1884 collection from Tehachapi by Mrs. Curran (Brandegee) has been designated as a lectotype (cf. L. Benson, Bull. Torrey Club 68: 172. 1941). Since it has not been rediscovered, the 1895 collection by Mrs. Brandegee from Tehachapi, May 16, 1905, *UC 205003* is designated as a neotype; duplicate neotype, *Pom 11643. Ranunculus californicus* var. *latilobus* is an epithet attributed by some botanists to this plant (cf. discussion under *R. californicus* var. *typicus*).

10 RANUNCULUS DOMINGENSIS Urb. & Ekm. Arkiv. Bot. 22A (8): 23. 1929

Appressed-hirsute terrestrial perennials; roots fibrous, wiry, about 1-1.5 mm. in diameter, not thickened into storage organs, produced along a short erect caudex; stems subscapose, erect or perhaps suberect, not rooting, about 3-4 dm. long, about 1.5 mm. in diameter, freely branching, not markedly fistulous; basal leaf blades simple, ovate in outline, apically 3- or up to 7-lobed, the lobes divergent, 3-5 cm. long, 1.5-3 cm. broad, very prominently 3-nerved, proximally rounded, distally truncate in outline across the lobes or (when 5-7-lobed) rounded or angled; petioles about 10-15 cm. long; cauline leaves none except the small bracts, sessile; pedicels 1-6 cm. long in flower, perhaps 4-10 cm. long in fruit; sepals 5, greenish-silvery, reflexed, narrowly elliptic, 3-4 mm. long, 1-1.5 mm. broad, densely appressed-pubescent, about half the length of the petals; petals 5, ovate, 8-10 mm. long, 5-6 mm. broad; stamens apparently 25-35; achenes not seen, the pistils about 10-15, the styles slender, about 1.5 mm. long, strongly recurved; receptacle about 1 mm. long in flower, about 1.3 mm. long in fruit, hispid.

Pine woods at 6,000 to 8,000 feet elevation. Hispaniola in both Haiti and Santo Domingo.

Specimens examined.—HAITI: High ridge, La Selle Mountains, *Ekman 3159, US*, photograph *Pom-B.*

SANTO DOMINGO: Cordillera de Bahoruco, *Ekman 6805, US* (isotype, cf. below).

Type collection.—"Santo Domingo in prov. Barahona, Cordillera de Bahoruco, in Sierra de los Comisarios locis subhumidis pinetorum 2,100 m. Aug. flor. et fruct: n. H. 6805 (typus). . . ." Isotype, *US 1410562*, photograph *Pom-B.*

11 RANUNCULUS UNCINATUS D. Don.*

Hirsute or hispid to glabrous terrestrial annuals or perennials; roots 0.5-1

* The three new combinations under *Ranunculus uncinatus* were published in advance in the May issue of the proceedings of the [illegible] order that validation might precede the appearance of a flora of Marin County, California, by Mr. John Thomas Howell.

mm. in diameter; stems erect, not rooting, 3-10 dm. long, 2-6 mm. in diameter, freely branching above, simple for 2 or 4 dm. below, fistulous, glabrous or hispid with the hairs reddish-brown or white; basal leaf blades simple, cordate-reniform, 2-9 cm. long, 2-14 cm. broad, 3-parted, the parts lobed and obtusely or acutely toothed, proximally cordate and distally acute, glabrous or appressed-hispidulous; petioles 5-17 or 25 cm. long, glabrous to densely hispid, the hairs white or reddish-brown, stipular leaf bases oblong, 2-3 cm. long, 10-12 mm. broad, thin; cauline leaves alternate, petioled; pedicels 1-8 or 20 mm. long in flower, 1-5 cm. long in fruit, appressed-pubescent; sepals 5, yellowish green, reflexed (not strictly so), narrowly elliptic, 3 mm. long, 1-1.5 mm. broad, appressed-pubescent dorsally, slightly longer or shorter than the petals, promptly deciduous; petals 5, rarely fewer, yellow, narrowly elliptic, , 2.5-3 or rarely 4-7 mm. long, 1-1.8 or rarely 3 mm. broad, the nectary scale glabrous, free for three-fourths its length, rounded or truncate at the apex; stamens 10-15; achenes 5 or 8-30 or rarely 40 in globose-ovoid or hemispheroidal cluster 3-5 mm. long and 4-5 mm. in diameter, each achene discoid, elliptic, or obovate, 1.8-2.5 or rarely 3 mm. long, 1.3-1.9 or rarely 2.5 mm. dorsoventrally, 0.8 mm. laterally, smooth or with a trace of reticulation, glabrous or hispid, the margin not prominent, the beak slender, 1-2 mm. long, 0.3-0.5 or rarely 0.7 mm. broad at the base, recurved and hooked at the tip; receptacle subglobose or pyriform or rarely ovoid, 0.5-1 mm. long in flower, 1-1.5 or rarely 3 mm. long in fruit, glabrous.

11a RANUNCULUS UNCINATUS var. TYPICUS

R. uncinatus D. Don in G. Don, Gen. Syst. Gard. 1: 35. 1831. *R. tenellus* Nutt. in Torr. & Gray, Fl. N. Amer. 1: 23. 1838, not Viviani in 1831, not *R. Andersonii* var. *tenellus* S. Wats. in 1871. *R. Nelsonii* DC. var. *tenellus* A. Gray, Proc. Amer. Acad. 8: 374. 1872. *R. occidentalis* Nutt. var. *tenellus* A. Gray, Proc. Amer. Acad. 21: 373. 1886. *R. Bongardii* Greene var. *tenellus* Greene, Erythea 3: 54. Apr. 1, 1895. *R. Nelsonii glabriusculus* Holzinger, Contr. U. S. Nat. Herb. 3: 210. Nov. 23, 1895. *R. Douglasii* Howell, Fl. N. W. Amer. 1: 18. Mar. 1897. *R. arcuatus* Heller Bull. Torrey Club 24: 319. June 29, 1897. *R. Bongardii* Greene var. *Douglasii* Davis. Minn. Bot. Studies 2: 479. 1900. *R. uncinatus* var. *typicus* L. Benson, Amer. Midl. Nat. 39(3): 761. May 1948.

Sparsely hirsute or glabrous terrestrial annuals or perhaps sometimes perennials; stems 2-4 or 5 mm. in diameter, glabrous or somewhat hirsute with soft white hairs; basal leaf blades 2-5 or rarely 7.5 cm. long, 2-7 or rarely 13 cm. broad, 3-parted and the parts lobed, the ultimate lobes obtuse or sometimes acute, glabrous, petioles 5-15 or 25 cm. long, glabrous or somewhat hirsute, cauline leaves usually larger than the basal, achenes 5 or 12-30 in a globose-ovoid or hemispheroidal cluster 4-5 mm. long and 4-5 mm. in diameter, each achene discoid, obovate, or elliptic, 2-2.5 mm. long, 1.7-1.9 mm. dorsoventrally, 0.8 mm. laterally, smooth or minutely reticulate, glabrous, the beak 1-1.5 mm. long, 0.3-0.5 mm. broad at the base, recurved and hooked at the tip.

Moist shaded ground at from near sea level to about 7,000 or 8,000 feet elevation in the Pacific Forest and mostly the Sierran and Rocky Mountain montane forests. Southern coastal Alaska; British Columbia; occasional in Western Washington and Western Oregon and occurring sparingly southward

to Sonoma County and the Sierra Nevada and San Bernardino Mountains, California; most common in the mountainous parts of the Great Basin in eastern British Columbia, Eastern Washington, Eastern Oregon, Idaho, and western Montana; Colorado (White River Region); northern Arizona north of the Grand Canyon; Mexico in an unknown locality. On the Pacific Slope var. *typicus* is localized mostly where rivers cut through the Cascade Mountains from the Great Basin.

At Snoqualmie Falls, Washington, on May 4, 1929, var. *typicus* was found to be in flower and young fruit (*L. Benson 1228, Wash, Pom-B, DS, Mo, 1229, Pom-B, Wash, DS, Mo.*) while var. *parviflorus* growing with it was just coming into flower (*L. Benson 1230, Pom-B, DS, Wash, 1231, Pom-B.*) Where the two varieties grow together, the characters occur sometimes in various recombinations. However, the mostly costal var. *parviflorus* and the largely interior var. *typicus* are significantly different in several ways. Despite intergradation, some might maintain them to be separate species. The presence or absence of hair on the fruit has been adopted usually as an arbitrary criterion for segregating the relatively uncommon intermediate plants having characters of both varieties.

Discovery of the identity of *Ranunculus tenellus* Nutt., hitherto treated as a variety of *R. Bongardii* Greene, with *R. uncinatus* D. Don, based upon specimens from Mexico, makes necessary a considerable nomenclatorial shift for plants occurring in northwestern and western North America. It would seem a possibility that the specimen attributed to Mociño and Sessé a century and a half ago and named by D. Don may have been obtained in western or northwestern North America by some other collector. However, there is no evidence of this, and data reported recently (St. Louis Meetings of the A. A. A. S., March, 1946) by Rickett indicates that Sessé, Mocino, et al. traveled rather widely in south-central Mexico, where they visited many out-of-the-way localities, one of which may have a local poulation of *R. uncinatus*.

Significant specimens.—CALIFORNIA: Only the southern portions of the range are outlined by the specimens cited. MENDOCINO CO. Near mouth of Navarro River 10 miles below Wendling, *Peirson* in 1923, *Peirson* 3723 (achenes with a few marginal hairs); Navarro (either the ghost town at the mouth of the river or Wendling, known also as Navarro), *M. S. Baker 5992, SRJC.* SONOMA CO. Mouth of Gualala River, *M. S. Baker 8214, CAS.* BUTTE CO. Jonesville, *Copeland 641* (in part) *CAS, UC, Pom, SD.* PLUMAS CO. *Austin* in 1876, *UC;* Culver's Spring, Mohawk Valley, *Lemmon* in 1889, *UC;* Forest Reserve, *Eastwood 14885, CAS.* NEVADA CO. Hobart Mills, *Drew* in 1925, *UC;* Donner Lake, *Sonne* in 1884, *DS, UC, HGr.* PLACER CO. Emigrant Gap, *M. E. Jones 3308, CAS, Utah;* Truckee River, *Sonne* in 1886, *Ill;* Sunnyside, Lake Tahoe, *Eastwood 23, CAS, 25, CAS;* Lake Tahoe, *M. E. Jones* in 1929, *Pom.* TUOLUMNE CO. Leland (Iceland?) Meadow, *Quick 1306, CAS.* MARIPOSA CO. Wawona, *Congdon* in 1897, *DS, J. T. Howell 80, CAS;* Big Trees Yosemite National Park, *Bolander 6259, UC;* Mariposa Grove of Big Trees, *L. Benson 7773, Pom-B.* MADERA CO. Miami Ranger Station, *Gillogly 15* in 1938, *Pom-B.* SAN BERNARDINO CO. Seeley's Flat, *Parish 2316, HGr, DS;* Lake Arrowhead, *L. Benson 11805, Pom-B* (and several sheets to be distributed); Little Bear Valley, *Parish 5797, DS;* Grass Valley at the eastern base of the San Bernardino Mountains, *Parish 3030, DS, HGr, Mo.*

ARIZONA: COCONINO CO. Kanabowitz Spring, North Rim of the Grand Canyon, *Collom* in 1940, *Pom-B, US, GCNP;* Neal Spring, North Rim of the Grand Canyon, *Collom* in 1940, *Pom-B, GCNP.*

COLORADO: Head of West Miller Creek, White River Region, *Tidestrom 1695*, *CAS*, *US*.

MEXICO: *Mociño & Sessé*, *Lambert Herbarium* (probably type of *R. uncinatus*, cf. below), photograph *F*; *Sesse, Mocino, Castillo, & Moldonado* in 1787, 1795, or 1804, *F* (in part) (probably an isotype, cf. below; mixed with a specimen of *R. petiolaris* var. *Hookeri*).

Type collections.—(1.) *R. uncinatus*, "Native of Mexico." "D. Don in herb. Lamb." Probably actually the Mociño & Sessé collection cited below, which bears the label "R. uncinatus D. Don." Probable type, photograph *F 750808* (rephotograph *Pom-B*) (Sessé, Mociño, Castillo, & Moldonado in 1787, 1795, or 1804); isotype, *F 0*[illegible] (in part); mixed with a plant of *R. petiolaris* var. *Hookeri*, photograph *Pom-B*. (2.) *R. tenellus*, "Shady woods of the Oregon [Columbia] and Wahlamet [Willamette] Rivers, *Nuttall!*" Isotypes, *NY*, *GH*, photograph *DS*. (3.) *R. Nelsonii glabriusculus*, "*R. nelsonii tenellus* Gray, Proc. Amer. Acad. viii, 374 (1872); *R. tenellus* Nutt.; Torr. & Gray Fl. i, 25. (1838), not Viviani. . . . Rich bottoms near Lapwai Agency, Nez Perce County, Idaho; May 5 (No. 126). Also on the Clearwater River near mouth of Big Potlatch River and in the Valley of the Little Potlatch." Apparently the epithet was intended as a substitute for *tenellus*, and none of the three collections listed (*Sandberg, Macdougal, & Heller* in 1892) was intended as a type. Typical of those mentioned above, however, is the Lapwai Agency Collection, represented in the herbaria as follows: *NY*, *CAS 134819*, *DS 43464*, *96240*, *Ill*, *GH*, *Pom 100040*, *150700*. It is number 126 of the season's collecting. (4.) *R. Douglasii*, nom. nov. for *R. tenellus*. (5.) *R. arcuatus*, same.

11b RANUNCULUS UNCINATUS var. PARVIFLORUS (Torr.) L. Benson
Amer. Midl. Nat. 39 (3): 761. May, 1948

(Moderate policy: *R. Bongardii* Greene)

R. occidentalis Nutt. var. *parviflorus* Torr. Bot. Wilkes Exped. 17: 214. 1874. *R. occidentalis* var. *Lyallii* A. Gray, Proc. Amer. Acad. 21: 375. 1886. *R. Bongardii* Greene, Erythea 3: 54. April 1895. *R. tenellus* var. *Lyallii* Rob. in A. Gray, Syn. Fl. N. Amer. 1: 33. 1895. *R. Greenei* Howell, Fl N. W. Amer. 1: 18. 1897. *R Lyallii* Rydb. Mem. N. Y. Bot. Gard. 1: 166. 1900. *R. Bongardii Greenei Piper*, Contr. U. S. Nat. Herb. 11: 275. 1906.

Hispid perennials; stems 2-6 mm. in diameter, hispid with the hairs commonly reddish-brown; basal leaf blades 3-9 cm. long, 4-14 cm. broad, 3-parted, the parts lobed and acutely toothed, appressed-hispidulous; petioles densely hispid, the hairs reddish-brown; cauline leaves similar to and usually smaller than the basal; achenes 8-20 or 25 in a globose-hemispheroidal cluster 3-4 mm. long and 4 mm. in diameter, each achene ovate, 1.8 mm. long, 1.3-1.5 mm. dorsoventrally, 0.8 mm. laterally, *hispid*, the beak slender but broad at the base, 2 mm. long, recurved, hooked at the tip.

Shaded and rather moist places at 50 to 3,000 feet or inland up to 7,000 feet elevation in the Pacific and sometimes the Sierran and Rocky Mountain montane forests. Pacific Slope from Kodiak, Alaska, to Marin County, California; occasional in the interior from British Columbia to the Sierra Nevada and San Bernardino Mountains of California and to western Wyoming, and North Park, Colorado. Relatively common in the Pacific Forest in Idaho and western Montana. Late April to July.

From the statements of distribution given above and the essentially similar ones given earlier (Cf. L. Benson, Bull. Torrey Club 68: 477-9. 1941) it should be clear that, although the general ranges of var. *typicus* and var.

parviflorus are, on the whole, similar, usually the varieties do not occur together, and there is a great difference in relative abundance of the two over certain broad geographical regions. Var. *typicus* is a plant essentially of the Sierran and Rocky Mountain montane forests of the Great Basin and the Rocky Mountains, but it occurs here and there in the Pacific and Sierran montane forests on the Pacific Slope where the rivers cut across the mountains to the ocean. Var. *parviflorus* is prevalent in the Pacific Forest on the Pacific Slope, but it occurs here and there in the Sierran and Rocky Mountain montane forests of the interior. Apparently the two occur sometimes together in Alaka as they do elsewhere, and Hultén, Fl. Alaska & Yukon, Lund's Univ. Arrsk. II. 40 (1): 748. 1944, remarks that geographical segregation of the varieties ". . . can hardly be seen from the respective areas given by BENSON. . . ." Obviously this is true if only the range by states is considered, since the maximum geographical ranges of the varieties are somewhat the same. This is the reason for the carefully worded statement in the 1941 paper and for the amplified explanation here.

According to Hultén, if var. *typicus* (*R. Bongardii* var. *tenellus*) is largely interior and var. *parviflorus* (*R. Bongardii*) is coastal, the two ". . . should be taken as . . . geographical race[s]—subspecies—. . . ." This is exactly what has been done, except that the writer recognizes but one subspecific category (variety), and this is approximately what Hultén designates by the relatively recent term subspecies. This is not a matter of right or wrong but of individual policy. Undoubtedly Dr. Hultén's statement means simply that, according to his own usage of subspecific categories, the rank of subspecies would be employed instead of variety, which he considers lower.

Forms occurring in the Rocky Mountains, in the Blue Mountains, Washington and Oregon, and in the Wallowa Mountains, Oregon, have hair around only the margin of the achene, and sometimes they are allied more closely to var. *typicus*.

A plant, possibly a hybrid between *R. uncinatus* var. *parviflorus* and *R. acris* L., has been collected in Alaska as follows: Dutch Harbor, *J. P. Anderson 4100, ISC;* Gull Island, Lynn Canal, *J. P. Anderson 5410, ISC, Pom-B;* Juneau, *J. P. Anderson 6250, ISC, Pom-B.* The plant may be described as follows: Robust; petals obovate, 4-6 mm. long, 3-4 mm. broad; achenes resembling those of var. *parviflorus,* long-hispid or glabrous, the beaks remarkably broad and elongate. Mr. J. P. Anderson, the collector of this plant, considers it to be a hybrid. In his letter of May 13, 1943, Mr. Anderson wrote as follows: "I first collected it at Dutch Harbor in 1938. It was intermingled with the parent forms. In 1939 I found *R. acris* growing at the west entrance to Evergreen Cemetery in Juneau. It is an introduced species and this was the first appearance at that locality. . . . In 1940 this hybrid form was found along with the parent forms. It had not been there previously. Another evidence of hybridity is sterility. While both parent forms matured achenes in abundance this hybrid failed to mature any at all."

A possible hybrid with *R. acris* L. var. *frigidus* Regel is the following collection from the Aleutian Islands, Alaska: Chicagof Harbor, Attu Island, *Van Schaack 894,* Aug. 17, 1945, *Pom-B.*

Significant specimens.—ALBERTA: The Gap, Crows Nest Pass, *Macoun* in 1897, *Geol. Surv. Can 18064, Can.*

OREGON: Common in Western Oregon; the following few specimens from Eastern Oregon. GRANT CO. Blue Mountain Springs, *Peck 10340, WillU;* Austin, *Ripley & Barneby 6593, Pom.* BAKER CO. Below Anthony Lake, *Maguire & Holmgren 26955* in 1946, *Pom.* WALLOWA CO. Wallowa Lake, *M. E. Jones 25298* in 1930, *Pom, McCalla 5597, Pom-B;* Hurricane Creek Camp, Wallowa Mountains, *Maguire & Holmgren 26696* in 1946, *Pom.*

CALIFORNIA: (Specimens outlining only the scattering southern stations) TRINITY CO. Willow Creek near Weaverville, *M. E. Jones 28899* in 1931, *Pom.* MENDOCINO CO. Glen Basin, *Eastwood & Howell 2670, CAS;* Gualala River, *M. S. Baker 8124, SRJC.* MARIN CO. Shell Beach or "Twin Beaches," *J. T. Howell 20928, CAS.* (also Point Reyes Road, head Drakes Estuary, *J. T. Howell* in 1939, *CAS.*) PLUMAS CO. Warner Valley, *Austin 1207, NR;* Culver Spring, Mohawk Valley, *Lemmon* in 1889, *NR.* FRESNO CO. Pine Ridge, *Hall & Chandler 131* in 1900, *NY* (achene beak short), *UC* (achene beaks short), *Mo;* Shaver Lake, *Vestal* in 1938, *Pom-B.* SAN BERNARDINO CO. (San Bernardino Mts.) *H. M. Hall* in 1899, *UC;* Green Valley, *Shaw 53, DS, Roos* 1869, *Pom;* Little Bear Valley, *Parish 10944, DS, UC, Mo, Chandler* in 1897, *UC.*

COLORADO: ROUTT CO. Steamboat Springs, *Osterhout 4971, RM.* LARIMER CO. North Park, *Osterhout* in 1896, *HGr, RM, NY.*

Type collections.—(1.) Var. *parviflorus*, "Plains between Puget Sound and the Cascade Mountains." *Wilkes Expedition.* Possible type, *US 1100*, labelled as *R. recurvatus*, "Puget Sound," *Wilkes Exped. 267.* "Var. δ" has been written in pencil on the label. (2.) Var. *Lyallii*, "Lyall's specimens are from Pend Oreille River, in Idaho." Type, *GH*, photograph *DS.* (3.) *R. Bongardii*, "**Ranunculus Bongardi.** R. recurvatus, Beng. Veg. Sitch mainly, not of Poiret." (4.) *R. Greenei.* "*R. occidentalis* var. *Lyallii Gray, Proc. Am. Acad. xxi, 373.* . . . Common in the open Fir forest, Oregon to British Columbia." Since no specimen is mentioned, *R. Greenei* is considered to have been proposed as a new name for Gray's var. *Lyallii* and to be based upon the same type.

11c RANUNCULUS UNCINATUS var. EARLEI (Greene) L. Benson
Amer. Midl. Nat. 39(3): 761. May, 1948

(Liberal policy: *R. Earlei* Greene)

R. Earlei Greene, Pittonia 4: 15. 1899. *R. Bongardii* Greene var. *Earlei* L. Benson, Bull. Torrey Club 68: 479. 1941.

Perennial, basal leaves larger than the cauline, or the plant with no cauline leaves other than the bracts, pilose, the hairs 1-1.3 mm. long; petals ovate, 4-6 mm. long, 2-3 mm. broad; achenes 15-40 in a subglobose or ovoid head, each about 2.5-3 mm. long, about 2-2.5 mm. dorsoventrally, the beaks 1 mm. long, 0.5-0.7 mm. broad at the bases; receptacle in the fruit 3 mm. long, ovoid.

Along streams at 6,500 to 8 000 feet elevation in the Rocky Mountain Forests. Southwestern Colorado from Mesa and Delta counties to Montezuma County; Albuquerque, New Mexico. June or early July.

Related to *R. acriformis* var. *montanensis.*

Specimens examined.—COLORADO: Elk Mountains, *Brandegee 13261* in 1881, *Mo, UC.* MESA CO. Uncompahgre Plateau, West fork of Dry Creek, *Tidestrom 1556, US.* DELTA CO Leroux Creek, 8,500 feet, *Cowen 29* in 1892, *NY.* SAN MIGUEL CO. Trappers Lake, *Hanna 1520, Mo;* Trout Lake, *Payson & Payson 4148, GH, DS, UC, RM, Mo.* MONTEZUMA CO. Bob Creek, West La Plata Mountains west of Mt. Hesperus, *Baker, Earle, & Tracy 187* in 1898, *HGr, NY, GH, DS, UC, Clo, Pom, RM* (2

sheets), *Mo* (2 sheets), *US;* Mancos River Bottoms, 7,000 feet, *Baker, Earle, & Tracy 38* in 1898, *HGr, Pom-B, US, NY, RM, Mo* (type and isotypes); Mancos River, *Baker, Earle, & Tracy 39, HGr, NY, Pom, Pom-B, RM, Mo, US.*

NEW MEXICO: BERNALILLO CO. "Albuquerque," *Plank* in 1895, *NY.*

Type collections.—"Along the Mancos River and other streams, June 22, and 28, Baker, Earle and Tracy (38, 39, 187)." *Baker, Earle & Tracy 38* collected along "Mancos River Bottoms, 7,000 ft." has been designated as a lectotype cf. L. Benson, Bull. Torrey Club 68: 480. 1941. Lectotype, *HGr 2565;* isotypes *Pom-B 268463, US 337029, NY, RM* (not numbered), *Mo* (not numbered).

12 RANUNCULUS RECURVATUS Poir.

Hirsute terrestrial perennials; roots 1 mm. in diameter; stems erect, commonly forming a nearly spherical bulbous base 5-10 mm. in diameter, not rooting, 1-5-5 dm. long, 1.5-3 mm. in diameter, branching mostly above, the lowest internode elongated, fistulous, markedly hirsute or rarely glabrous, the hairs rarely appressed; basal leaf blades simple, cordate-reniform in outline, 2-5 or 7.5 cm. long, 3-6 or 9 cm. broad, 3-cleft to deeply 3-parted, the parts either crenately lobed or toothed, proximally cordate and the parts distally rounded or angled, nearly glabrous or hirsutulous or hirsute; petioles mostly 5-10 cm. long, glabrous or hirsute, the stipular leaf bases deltoid, 1-1.8 cm. long, 5-9 mm. broad, thin; cauline leaves similar to the basal but not usually larger, as deeply parted as the deepest of the basal; pedicels 0.1-0.8 cm. long in flower, 1-5 cm. long in fruit, sparsely appressed-pubescent; sepals 5, greenish, reflexed almost their whole length, ovate-acute, 4-5 mm. long, 2-2.5 mm. broad, sparsely pilose dorsally, promptly deciduous; petals 5, narrowly elliptic, 2.5-3.5 mm. long, 1.2 mm. broad, the nectary scale in var. *typicus* forming an obdeltoid pocket (unique in the section *Crysanthe*), the distal margin truncate or sometimes proliferated into a flap much like the free scale in the other species of the section, in var. *typicus* the scale not forming a pocket; stamens 10-25; achenes 10-25 in a globose head 5-7 mm. in diameter, each achene discoid, 1.5-2 mm. long, 1.5 mm. dorsoventrally, 0.6 mm. laterally, minutely reticulate-pitted, glabrous, the margin with a minute keel, the beak slender, 1.2-1.4 mm. long, recurved, the tip hooked; receptacle broadly or narrowly pyriform, 1 mm. long in flower, 3-3 mm. long in fruit, conspicuously hispid, densely so at the apex.

12a RANUNCULUS RECURVATUS var. **typicus** nom. nov

R. recurvatus Poir. in Lam Encyc. Meth. 6: 125. 1804. *R. saniculaeformis Muhl.* Cat. 54. 1813. *R. hirtus* Muhl. ex Steudl, Nom. ed. 2. 433. 1841, as syn. *R. recurvatus* var. *adpressipilis* Weatherby, Rhodora 31: 164. 1929. *R. recurvatus* f. *laevicaulis* Harger ex Weatherby, Rhodora 31: 164. 1929. *R. recurvatus* var. *fontinalis* Peattie, Jour. Elisha Mitchell Soc. 44: 205. 1929. *R. recurvatus* f. *Hargeri* Weatherby ex Peattie, Jour. Elisha Mitchell Soc. 46: 155. 1931, as syn. (incorrectly ascribed to Weatherby).

Stems from the bulbous base commonly 5-10 mm. in diameter; lobes of the leaves usually toothed rather than again shallowly lobed, the teeth commonly sharp; petals 2.5-3.5 mm. long, distinctly shorter than the sepals, the nectary scale forming an obdeltoid pocket commonly covering about one-fourth of the petal surface, truncate.

Woods and bottom-land thickets at low elevations in the Northern, Deciduous, and Southeastern Pine and Riverbottom forests. Ontario to Newfoundland and southward to Minnesota, Texas (Marshall County), and Georgia; attributed to Whidby Island, Puget Sound, Washington. April to June.

Significant specimens.—WASHINGTON: ISLAND CO. "Spring on Whidby's Island; rare," *J. G. Cooper*, April 20, 1853-55 (Pac. R. R. Surv.; Stevens Exped.), *US 111*. It is possible that specimens collected farther east were substituted somehow for a collection of *R. uncinatus* or var. *parviflorus*. However, there is no evidence of this.

ONTARIO: Ottawa, *Macoun* in 1886, *NY;* Bachewana Falls, *Taylor, Losie, Fitzpatrick, & Leslie 2263, Can;* Bellville, *Macoun* in 1869, *Can;* Niagara, *Macoun* in 1901, Can.

QUEBEC: Montagne de Saint-Pie, Co. de Bagot, *Victorin & Germain 33094, NY;* Montmorency Falls, *Macoun* in 1905, *Geol. Surv. Can. 66678, Can.*

NEWFOUNDLAND: Port au Port ("The Gravels"), *Fernald & Wiegand 3421, GH;* Harry's Brook (Force le Plain pool), *Kennedy 94* in 1924, *GH.*

NORTH DAKOTA: RICHLAND CO. Cheyenne River, Leonard, *Stevens 428, Clo, RM, Mo.*

NEBRASKA: Place name illegible (perhaps Millard), *A. S. Hitchcock* in 1899, *Mo.* OTOE CO. Nebraska City, *Thornber* in 1900, *Pom-B.* CASS CO. South Bend, *A. S. Hitchcock* in 1900, *Mo.*

OKLAHOMA: DELAWARE CO. Dripping Springs, *Small & Wherry 12255, NY, Hopkins 3231, Mo..*

TEXAS: HARRISON CO. Marshall, *Palmer 5239, Mo, Pom.*

Type collections.—(1) *R. recurvatus*, "Cette plante croîte en Amerique, dans les environs de New York . . . in herb. Lamarck." (2) *R. hirtus*, syn. for *R. recurvatus*. (3) *Var. adpressipilis*, "VIRGINIA: Hungry Hollow, alt. 2,200 ft., northeast of Marion, Smyth Co., May 24, 1892, Small. Type in Gray Herb." Type *GH*, photograph, *Pom-B;* isotype, *NY*. This form is remarkable for appressed hairs, which are unicellular. (4) *F. laevicaulis*, "MASSACHUSETTS: by brook, Whately, May 17, 1913, Fernald & Harger, Type in hb. N. E. B. C. (also a mixed sheet in Herb. Gray)." Isotype, *GH*. (5) *Var. fontinalis*, "Type specimens: In a waterfall, April 9, 1919 (Day). In a waterfall, Melrose Mt., April 3, 1929 (PT. 068). Pearson's Falls, in the water, May 11, 1926 (PT, no. 2188)." Polk County, North Carolina and adjacent South Carolina. (PT equals Peattie.)

12b RANUNCULUS RECURVATUS var. TROPICUS (Griseb.) Fawc. & Rendle, Fl. Jamaica 3: 188. 1914

(Liberal policy: *R. cubensis* Griseb.)

R. repens L. var. *tropicus* Griseb. Fl. Brit. W. Ind. 1. 1859. *R. cubensis* Griseb. Cat. Pl. Cub. 1. 1866.

Bulbous thickening of the stem base less evident or none; lobes of the leaves commonly crenately again lobed or toothed, the lobes usually not sharp; petals 3.5-5 mm. long, exceeding the sepals, the nectary scale either forming a small pocket or the upper portion proliferating outward and forming a flap longer than the pocket (transitional to the type in the other species of the section *Chrysanthe*).

Moist woods, meadows, and rivulets in the mountains at 4,000 to 7,000 feet elevation. Cuba, Jamaica, and Hispaniola.

Specimens examined.—CUBA: *Wright 1838, GH, Mo 212076,* (isotypes of *R. cubensis*); El Gigante, Sierra Maestra, *Ekman 16091, NY.*

JAMAICA: *Hart 555, US;* Blue Mountain Peak *Hitchcock* in 1890, *Mo, Maxon 9915, NY, US, Hannewell & Griscom 14315, GH;* Trail to New Haven Gap, *A. Taylor 4216, F, NY;* Portland Gap, *Collins 73, US;* Morce's Gap, *Shreve 493, UA-Shr, Maxon & Killip 1085a US, Killip 297, US, Maxon 1223, US, Nichols 27, US, Mo, F, NY, GH;* St. Helen's Gap, *Britton 98, NY;* Abbey Green, *Orcutt 5174, UC.*

HAITI: Marie Claire, *Holdridge 1232 US;* Fonds Varettes, *Leonard 3992, US;* Petionville, La Selle Mountains, *Ekman 1453, US;* above Port au Prince, La Selle Mountains, *Ekman 5427, US;* Marigol, La Selle Mountains, *Ekman 7984, US.*

SANTO DOMINGO: Rincon, Prov. Barahona, *Fuertes 1335, NY, GH;* Prov. Vega, *Fuertes 1722, NY, GH;* Constanza, *Turckheim 3139, GH, Mo, NY, F, US;* Valle Nuevo above Constanza *Chardon 32* in 1937, *NY* (in part).

Type collections.—(1.) *Var. tropicus,* "Hab. Jamaica!, Macf. [Macfayden.], on the Blue Mountains, Elev. 5000'. . . ." (2.) *R. cubensis,* "Cuba or., in monte Toro, (Wr. 1838) E." *Wright.* Isotypes listed above.

13 RANUNCULUS PENSYLVANICUS L.* f. Suppl. 272. 1781

(?) *R. canadensis* Jacq. Misc. 2: 343. 1781.

Hirsute to hispid terrestrial annuals or probably sometimes perennials; roots often numerous, 0.7-1 mm. in diameter, stems erect, not rooting, 4-10 dm. long, 2-10 mm. in diameter, branching above, the lower internodes usually elongate, fistulous, hirsute to hispid, the hairs 2 mm. long; basal leaves withering early, pinnately compound, 5-7 cm. long, 9-12 cm. broad, the leaflets petiolulate, cuneate, the middle one 3-parted, the lateral ones 2-parted, the petioles 3-15 cm. long, hirsute, the stipular leaf bases 1-2.5 cm. long; cauline leaves alternate, similar to the basal, the bracts similar to the cauline leaves, but reduced, sessile, pedicels 0.3-1.8 cm. long in flower, 1.5-5.5 cm. long in fruit, appressed-pubescent; sepals 5, yellowish, reflexed, narrowly elliptic, 4-5 mm. long, 2-2.5 mm. broad, slightly hairy, twice the length of the petals, promptly deciduous, petals 5, yellow, nearly orbicular, 2-3 mm. long, 2-3 mm. broad, the nectary scale glabrous, free for two-thirds of its length, about the breadth of the adjacent petal surface; stamens 15-20; achenes 60-80 in a cylindroid or cylindroid-ovoid head 10-14 mm. long and 7-9 mm. in diameter (rarely shorter), each achene ovate, about 2.5 mm. long, 1.8 mm. dorsoventrally, 0.5-5.6 mm. laterally, smooth, glabrous, the margin prominent, keeled, the beak stout, 0.6-0.9 mm. long, not recurved, curved a little at the tip; receptacle cylindroid, slender, about 2 mm. long in flower, 8-12 mm. long in fruit (rarely shorter), pubescent.

Wet grounds of woods, meadows, and bottom lands at low or moderate elevations in the Northern, Pacific, Rocky Mountain, Sierran Montane, and Deciduous forests and in the grasslands. Burma; China; Alaska to Washington and eastward across Canada and the two northernmost tiers of states to Newfoundland and New Jersey; occasional southward in the Rocky Mountains as far as northeastern Arizona and New Mexico (Rio Arriba County and the Datil Mountains).

The plants from Arizona and New Mexico have shorter fruiting receptacles and so also have specimens from Itasca Park, Minnesota, (*Mayer 318, NY*).

* Concerning the spelling of the specific name, cf. Fern. Rhodora 42: 94-5. 1940 and Egler, Rhodora 43: 220-222. 1941.

Significant specimens.—ALASKA: Juneau, *J. P. Anderson 461, NY;* Alaska Range near Paxon's, *Went* in 1924, *UC;* Anchorage, *Dutilly, LePage, & O'Neill 20954, Pom.* The following additional collections are cited by Hultén, Fl. Alaska & Yukon, Lunds Univ. Arssk. II. 40(1): 765. 1944; Circle, *J. P. Anderson 2547;* Fairbanks, *J. P. Anderson 2658;* Matanuska, *J. P. Anderson 943.*

WASHINGTON: Georgetown, Duwamish River, *Frye* in 1908, *Wash.* The species is distributed more widely in the state than has been supposed, but it is not common. MASON CO. Lake Isabelle, *Otis 2155, Wash, CAS, WSC, DS, UC.* WHATCOM CO. Sumas, *Henderson* in 1892, *Wash;* Marietta, *Muenscher 7861, WSC, 7862,* Utah; *McCloud* Lake, *Suksdorf 2213, HGr, UC, NR;* Bellingham, *Frye* in 1909, *Wash.* KING CO. Seattle, *E. C. Smith* in 1890, *HGr, Mo.* PIERCE CO. Puyallup, *Piper* in 1897, *Wash, Flett* in 1897, *NR;* Tacoma, Elliott, *UA.* KLICKITAT CO. Falcon Valley, *Suksdorf* in 1882, *WSC.* OKANOGAN CO. Alma, *Elmer 542, UC, Ill;* Sinlehekin Creek, *Fiker 2323, WSC;* Nespelem Road, *Fiker 1466, WSC;* Omak Lake, *Fiker 684, WSC.* CHELAN CO. South of Chelan, *J. W. Thompson 6912, Mo.* YAKIMA CO. Yakima region, *Brandegee* in 1882, *UC.* STEVENS CO. "Rocky Mountains" [Fort Colville], *Geyer 580, DS.* SPOKANE CO. Tyler, *G. N. Jones* in 1927, *WSC.*

ARIZONA: NAVAJO CO. Lakeside Ranger Station, *Pultz 1665.* Specimen studied on loan from T. H. Kearney. YAVAPAI CO. Woods Ranch, Camp Verde, *MacDougal* in 1891, *US.* NAVAJO OR APACHE CO. Ryan Ranch, East Fork of White River, *Harrison 4868, Sac, US.*

NEW MEXICO: RIO ARRIBA CO. Ensenada, *Standley & Bollman 11104, US;* Vallecitos, *Eggleston 20475, NY, US.* SOCORRO CO. Middle Fork of Gila River, Mogollon Mountains, *Wooton* in 1900, *US.* GRANT CO. Mangas Mountains, Datil Forest, *Eggleston 20229, NY.*

Type collections.—(1) *R. pensylvanicus,* "*Habitat in* Pensylvania." (2) *R. canadensis,* none given. Reference to *R. pensylvanicus* may or may not be correct.

14 RANUNCULUS MACOUNII Britt. Trans. N. Y. Acad. Sci. 12: 3. 1892

R. hispidus Michx. var. *oreganus* A. Gray, Proc. Amer. Acad. 21: 376. 1886. *R. oreganus* Howell, Fl. N. W. Amer. 1: 19. 1897. *R. Macounii* var. *oreganus* Davis, Minn. Bot. Studies 2: 469. 1900. *R. rudis* Greene, Ottawa Nat. 16: 33. 1902. *R. oreganus Macounii* Piper, Contrib. U. S. Nat. Herb. 11: 276. 1906. *R. rivularis* Rydb. Bull. Torrey Club 39: 319. 1912.

Hirsute or glabrous terrestrial or subpalustrine annuals or perennials; roots of the main system 1.5-2 mm. in diameter; stems reclining (at least below) or prostrate or suberect, often rooting at least at the lower nodes, 2.5-9 dm. long, 2-5 or 11 mm. in diameter, branching, fistulous, densely hirsute or hispid with hairs 2-2.5 mm. long or glabrous; basal leaf blades simple or pinnately compound, deltoid in outline, 3-8 cm. long, 5-13 cm. broad, divided into 3 divisions or pinnate with 3 or 5 leaflets 3-parted and the parts again lobed, pubescent or glabrous, the petioles 5-20 cm. long, densely hirsute or glabrous, the stipular leaf bases 1-3 cm. long; cauline leaves alternate, all but the uppermost similar to the basal and petioled; pedicels 0.3-2 or 8 cm. long in flower, 3-4.5 or 10 cm. long in fruit, usually appressed-hispidulous, sepals 5, yellowish, often purple-tinted, reflexed almost their whole length, ovate-triangular, 4-6 or 7 mm. long, 2.5-4 mm. broad, glabrous or pilose, not quite the length of the petals, promptly deciduous; petals 5, yellow, obovate, 3-5 or 7.5 mm. long, 2.5-3.5 or rarely 6.5 mm. broad, the nectary scale glabrous, free for nearly its whole length, truncate; stamens 15-35; achenes 20 or 30-50 in an ovoid-cylindroid head 7-12 mm. long and 5-7 mm. in diameter, each achene obovate with an acute base, 2 or 2.5-3 mm. long,

1.8-2 mm. dorsoventrally, 0.5 mm. laterally, smooth, glabrous, the margin conspicuously bevelled and narrowly keeled, the beak stout, nearly deltoid, 1-1.2 mm. long, gradually curving or straight with a right-angle bend at the very tip, 0.4-0.5 mm. broad at the base; receptacle fusiform-cylindroid, about 1-2 mm. long in flower, 4-5 mm. long in fruit, hispid.

Muddy ground of marshes, lake and stream borders, and ditches from sea level on the north coast to 7,500 feet elevation in the Rocky Mountains; Northern, Rocky Mountain, Pacific, and Sierran Montane forests, Sagebrush Desert, Juniper-Pinyon Woodland. Alaska to Labrador (Lake Melville) and Newfoundland and southward, almost wholly east of the Cascade Mountains, to California (Goose Lake), Northern and east-central Arizona, montane western New Mexico, Nebraska and Michigan (Isle Royle). Late May to August.

A geographically isolated glabrous relatively small form (var. *oreganus*) occurs chiefly along the lower Columbia River in Washington and Oregon. It is approached by a few scattering collections from localities northward and eastward, e.g. Killisnoo, Alaska, *Eastwood 985* in 1914, *CAS;* Mt. Vernon, Skagit County, Washington, *Roush* in 1930, *DS, Pom-B, UC;* Pullman, Washington, *Piper 3526, WSC.* Post Falls, Kootenai County, Idaho, *Sandberg, MacDougal & Heller 666, Pom, DS* (but the *PA* duplicate is clearly var. *typicus*).The following are the form known as var. *oreganus,* which might be segregated as a variety, though a weak one: WASHINGTON: COLUMBIA COUNTY. Ridgefield, *Lawrence* in 1919, *NR.* KLICKITAT COUNTY. Columbia River,*Suksdorf* in 1884, *DS, UC, PA, Pom, WSC,* Bingen, *Suksdorf 629 WSC 5556, WSC 5946, WSC.* OREGON: Numerous collections all along the lower Columbia River.

In specimens from the northern part of the range of *R. Macounii* adventitious rooting is uncommon. Rydberg, *loc. cit.,* has proposed segregation of the rooting form as a distinct species. This certainly is not justified, although it is possible that the plant should be recognized as a variety. As far as it is possible to judge from herbarium sheets, the non-rooting "form" occurs chiefly from Washington to Colorado and northward and the rooting form occurs in the states mentioned and southward. However, adventitious roots occur on even some plants collected in Newfoundland, and it is probable that the potential ability for rooting exists throughout the species. Herbarium specimens are inadequate for a clear segregation of the two forms, and other characteristics, apparently are not clearly associated with rooting and non-rooting. Much of the Southwestern material is perennial, and many of the erect plants from especially the northern part of the range are annual. One specimen with flowers and young fruit (Round Lake, Mackenzie Basin, northeastern Alberta, *Raup 2361, NY*) shows the pair of cotyledons still attached to the diminutive plant in anthesis. A larger plant (*Raup 2360, NY*) from Lake Mamawi, Mackenzie Basin, almost undoubtedly is annual also, but it is of normal size, and a normal-size duplicate of Raup *2361* is in the Gray Herbarium.

A plant collected at Wood Buffalo Park, Mackenzie Basin, in Alberta, *Raup 2367, GH,* represents a remarkably reduced form of *Ranunculus Macounii,* and at first it appeared to be an undescribed species related to *R.*

recurvatus. A series of specimens in the National Herbarium of Canada connects this plant with the more common forms of *R. Macounii*.

Significant specimens.—WESTERN WASHINGTON: SAN JUAN CO. Friday Harbor, *Roush* in 1919, *NR*. GRAYS HARBOR CO. Montesano, *A. A. & E. G. Heller 3850*, *UC*, *RM*, *GH*, *Mo*, *PA*, *Pom-B*. KING CO. Seattle, *Howell* in 1886, *NR*. PIERCE CO. Tacoma, *Flett* in 1897, *Wash*.

CALIFORNIA: MODOC CO. Devil's Garden, Goose Lake, *Austin* in 1895, *HGr* (type of *R. rudis*, cf. below), *Pom*. *Austin & Bruce* in 1898, *UC*.

NEBRASKA: KIMBALL CO. Kimball, *Rydberg* in 1891, *US*. KEARNEY CO. Minden, *Hapeman* in 1930, *DS*, *RM*.

MINNESOTA: CLAY CO. Glyndon, *Solheim 214* in 1929, *RM*. BAY CO. Grand Portage, *F. W. Wood* in 1891, *US*.

MICHIGAN: KEWEENAH CO. Isle Royle, *Cooper* in 1909, *GH*.

Type collections.—(1) Var., *oreganus*, based upon "*R. nitidus*, in part, Hook. Fl. i. 20—Shady and wet grounds, Oregon, on the Columbia, to Fraser River." According to Hooker, *loc. cit.*, "Abundant on the lower fertile plains of the Columbia, where it attains a height of 1½ to 2½ feet, extending into the mountain valleys, where it is of humbler growth. *Douglas*." (2) *R. Macounii*, based upon *R. hispidus* Hook. Fl. Bor. Amer. 1: 19. 1829, not Michx. in 1803. "Banks of rivers from Canada to near the mouth of the Mackenzie River lat. 67; and from the shores of Hudson's Bay to the Pacific. *Dr. Richardson. Drummond* (*Scouler. Douglas.*)." (3) *R. rudis*, "Discovered in a wet meadow in Devil's Garden, northern California, (Plumas or Lassen County) [Modoc Co.] June, 1895, by *Mrs. R. M. Austin*." Type *HGr 2796-7*; possible isotype, *Pom 99379*, though the label says July. (4) *R. rivularis*, "NEVADA: Huntington Valley, August, 1868, *S. Watson 27* (type, in herb. Columbia University)." Type, *NY*.

15 **Ranunculus pacificus** (Hult.) L. Benson, comb. nov.

R. septentrionalis Poir. subsp. *pacificus* Hult. Fl. Alaska & Yukon, Lunds Univ. Arrsk. II. 40(1): 769. 1944.

Somewhat hirsute probably subpalustrine perennials; roots, 1-1.5 mm. in diameter; stems suberect or reclining, not rooting, 3-5 dm. long, 3-5 mm. in diameter, branching above, fistulous, hirsute, the hairs about 2-2.5 mm. long; basal leaf blades mostly pinnate with 3 leaflets, cordate-deltoid in outline, 2-6 cm. long, 5-8 cm. broad, the leaflets 3-parted and again laciniately toothed, the leaf proximally cordate and distally acute in outline, appressed-hirsute beneath, the petioles 1-2 dm. long, somewhat hirsute, the stipular leaf bases 3-4 cm. long; cauline leaves alternate, the bracts laciniately parted and toothed to lanceolate and entire, short-petioled; pedicels 2-3 cm. long in flower, 4-5 cm. long in fruit, appressed-hispidulous; sepals 5, purplish-tinged, reflexed, ovate-lanceolate, attenuate, 7-8 mm. long, about 3 mm. broad, sparsely appressed-hispidulous, two-thirds the length of the petals, promptly deciduous; petals 5, yellow but dorsally tinged with purple, 8-10 mm. long, 5-6 mm. broad, the nectary scale well-developed, truncate; stamens about 20-30; achenes about 25 in an ovoid-globose head about 11-12 mm. long and 10-12 mm. in diameter, each achene ovate, 4 mm. long, 3 mm. dorsoventrally, 1 mm. laterally, smooth, glabrous, the margin prominent, bevelled, the beak stout, subulate, 2 mm. long, 1 mm. broad at the base, straight, hooked at the extreme tip; receptacle pyriform, 1-2 mm. long in flower, 5-7 mm. long in fruit, hispidulous.

Moist places along streams and in meadowland in the Pacific Forest at low elevations near the coast. Southern Alaska, from Yakatut southeastward (fide Hultén).

Of the several collections cited by Hultén, the writer has seen four, the significant ones being from the vicinity of Loring, *F. M. Chamberlain 130*, July 28, 1903, *US 422585*, photograph *Pom-B;* Ankow, River, *Piper 4468*, *US 420937;* and Yakatut, *Mr. and Mrs. E. P. Walker 1103, US 1289095*, photograph *Pom-B*. These specimens are good ones with both flowers and fruits. Vegetatively they show no difference from *R. Macounii* Britt., and it is possible that this plant is a variety of that species. The flower structure is definitely of the *R. Macounii* type, the difference being in size, which is approached closely by occasonal specimens of *R. Macounii* (e.g. Reno, Nevada, *Henrichs 296* in 1937, *Pom-B*). The achene differs also from that of *R. Macounii* more quantitatively than qualitatively, since in all parts it is larger. The beak and the body show some proportional differences, the beak being about one-half instead of one-third as long as the body and being much broader basally, and the beak is straight except for a minute hook at the tip. The straight beak occurs sometimes in *R. Macounii*. The adventitious rooting characteristic of *R. Macounii* is not shown by these collections, and, according to Hultén, it is not by the other specimens. This matter should be checked with care in the field, since, although the stems of *R. Macounii* have the capacity of rooting at the nodes under proper conditions, many collections do not show this character, the expression of which depends upon the environment. The fragmentary collection from Bradford Inlet (*Canavan* in 1894, *Geol. Surv. Can. 5638, Can.*, photograph *Pom-B*) cited by Hultén is a form of *R. orthorhynchus* Hook. var. *alaschensis* L. Benson with more than 5 emarginate petals. The other collections at the United States National Herbarium are on loan to Dr. Hultén.

R. pacificus is not of the *R. septentrionalis* group, despite the fact the leaves (as do those of *R. Macounii*) resemble strikingly those of *R. septentrionalis* and despite the straightness of the achene beak. It is to be noted that, although the beak of the fruit is straight, it is only half as long as the achene body, whereas in *R. septentrionalis* and most of its relatives the beak equals or exceeds the body or is at least two-thirds its length. As pointed out above, the flower structure is that of *R. Macounii*. In particular, the petals exceed the sepals only slightly, and the sepals are reflexed in exactly the same manner as in *R. Macounii*, instead of being the spreading type or practically always so as in *R. septentrionalis*.

One point is reminiscent of *R. orthorhynchus*. This is the purplish pigmentation (probably an anthocyan pigment) of the dorsal sides of the petals, which is duplicated in most of the collections of *R. orthorhynchus* var. *typicus* from Washington and Oregon.

Type collections.—"Hoonah NORBERG 198a (H, type of ssp. *pacificus*). . . ."

16 RANUNCULUS SEPTENTRIONALIS Poir. in Lam. Encyc. Meth. 6: 125. 1804

R. lucidus Poir. in Lam. Encyc. Meth. 6: 113. 1804 (?). *R. tomentosus* Poir. in Lam. Encyc. Meth. 6: 127 1804, not Moench in 1794. *R. Belvisii* DC. Syst. 1: 291. 1818. *R. nitidus* Muhl. Cat. ed. 2. 56. 1818, not Walt. in 1788. *R. intermedius* Eat.

Man. Bot. ed. 3. 424. 1822, not Poir. in 1804. *R. septentrionalis* var. *nitidus* Chapm. Fl. S. U. S. ed. 2, Suppl. 675. 1892. *R. octopetalus* Greene, Ottawa Nat. 16: 33. 1902. *R. caricetorum* Greene, Pittonia 5: 194. 1903. *R. sicaeformis* Mack. & Bush apud Mackenzie, Torreya 6: 123. 1906. *R. sicaefolius* Mack. & Bush ex Rydb. Fl. Prairies & Plains of Central No. Amer. 342. 1932, *nomen nudem*, apparently intended for *R. sicaeformis*. *R. septentrionalis* var. *caricetorum* Fern. Rhodora 38: 177. 1936.

Distinctly to densely hispid palustrine perennials; roots 1-1.5 mm. in diameter; the flowering stems suberect, 2-6 dm. long, but other stems *stoloniferous*, 3-10 dm. long, 2-8 mm. in diameter, branching, bearing 1-8 or rarely 10 flowers, usually sparsely appressed-hispid, but occasionally densely spreading- or (mostly Middle-Western plants) retrosely-hispid; *leaf blades compound or simple and 3-lobed, broadly ovate-cordate in outline*, 3-14 cm. long, 5-20 cm. broad, the leaflets 3-lobed, -cleft, or -parted and again toothed and lobed, the the blade proximally truncate or cordate and distally angular, subglabrous to appressed-hispidulous, petioles 3-30 cm. long, the pubescense like that of the stems, the stipular leaf bases 2-4 cm. long; cauline leaves alternate, the bracts much like the upper cauline leaves, often petioled; pedicels 1.5-6 cm. long in flower, 4-10 or 20 cm. long in fruit, appressed-hispidulous; sepals 5, greenish-yellow, *spreading*, elongate, tapering gradually to the apices, 6-11 mm. long, 2-5 mm. broad, appressed-pilose dorsally, two-thirds to three-quarters the length of the petals, early deciduous; petals 5 (or 7), yellow, obovate or elliptic or orbicular, 8-12 mm. long, 4-8 or 13 mm. broad, the nectary scale glabrous, free almost its whole length; stamens 40-75; *achenes about 15-30 or more* in an ovoid head 6-11 mm. long and 7-10 mm. in diameter, *each achene obovate, 3-3.5 mm. long, 2-2.5 mm. dorsoventrally*, 0.7 mm. laterally, smooth, glabrous, *the margin distinctly keeled but not winged*, prominent, the beak stout at the base, slender above, *2-3 mm. long*, straight; receptacle cylindroid, 2-3 mm. long in flower, 4-8.5 mm. long in fruit, hispidulous, but not densely so.

Marshy ground at low elevations largely in the Northern and Deciduous forests. Eastern edges of the Dakotas and Nebraska to James Bay and to Battle Harbor, Labrador, and southward to Missouri, Kentucky (rare) West Virginia; rare in northern Virginia and in North Carolina and Georgia. A collection labelled Buena Vista, central Colorado, probably represents confusion of labels (*E. T. & S. A. Harper* in 1886, *Wash*). April to early June or July or August northward.

This species produces long stolons very soon after the beginning of flowering, but most herbarium specimens do not show stolons, and this complicates separating many of them from *R. hispidus*. The species may be distinguished from *R. hispidus* by the broader and often apically free stipular leaf bases (as pointed out by Fernald).

The densely retrorsely-hispid form occurring here and there in the Middle West and in Cumberland, Maryland (*Shriver* in 1894, *NY*), is var. *caricetorum* (Greene) Fern. The direction of the trichomes is not associated with other characters, however.

Significant specimens.—NORTH DAKOTA: BARNES CO. Valley City, *Stevens* in 1934, *UC, RM*.

SOUTH DAKOTA: HAMLIN CO. West of Bryant, *L. W. Carter* in 1897, *NY*.

BROOKINGS CO. *L. H. Parks* in 1890, *Mo, T. A. Williams* in 1891, *Pom-B, US, Thornber* in 1894, *UA, Mo, WSC*, in 1895, *WSC, T. A. Williams* in 1894, *WSC, T. A. Williams* in 1897, *NY, RM, L. W. Carter* in 1897, *NY*.

KENTUCKY: *Short* in 1840, *NY, PA* (not marked 1840).

VIRGINIA: FAIRFAX CO. South of Alexandria, *A. Chase 2792, Pom, Ill;* Virginia shore of Potomac River above Plummer's Island, *Morris 1515, Pom-B*.

NORTH CAROLINA: MITCHELL CO. Summit of Roan Mountain, *Small & Heller 477* in 1891, *PA*.

GEORGIA: CHATHAM CO. Savannah, *J. D. Smith* in 1882, *US* (on two sheets).

Type collections.—(1) *R. septentrionalis*, "Cette plante croît dans l'Amerique septentrionale . . . in herb. Lamarck." (2) *R. lucidus*, "Cette plante est cultivée au Jardin les Plantes de Paris. On soupçonne originaire du Levant." (3) *R. tomentosus*, "Cette plante a été recueillie par M. Bosc dans la Haute-Caroline." (4) *R. Belvisii*, "Hab. in Americâ boreali. *Pal. de Beauvois.*" (5) *R. nitidus*, "Car. [Carolina]." Type in the herbarium of Muhlenberg. (6) *R. intermedius*, "Found on the banks of the Hudson near Albany, by Mr. J. G. Tracy." (7) *R. octopetalus*, "Knox Co., Tennessee, 10 June, 1893, T. H. Kearney." Type, *HGr, 2739*, photograph, *Pom-B*. The specimen from marshes near Fountain City, *Kearney*, June 10, 1893, *HGr 2738*, probably is part of the same collection. (8) *R. caricetorum*, "The above diagnosis is from material from my own gathering in southern Wisconsin in 1888, and in southern Michigan in 1902." The specimen from Dodgeville, Wisconsin, collected by Greene June 20, 1898, has been designated as a lectotype, cf. L. Benson, Bull. Torrey Club 68: 486. 1941. It is *HGr 2559-60-61; photographs* of 2559-60, *Pom-B*. (9) *R. sicaeformis*, "Collected by myself (no. 95) at Buckner, Jackson County, Missouri, on May 30, 1898 . . . in my herbarium," *K. K. Mackenzie*. Type, *NY* (*Mackenzie Herb.*), photograph, *Pom-B;* isotypes, *NY, GH*, photograph *Pom-B, RM 30471*, photograph *Pom-B, Mo*.

17 RANUNCULUS CAROLINIANUS DC. Syst. 1: 292. 1818, not *R. muricatus* L. var. *carolinianus* DC. in 1824

R. septentrionalis Poir. var. *pterocarpus* L. Benson, Bull. Torrey Club 68: 486. 1941.

Similar to *R. septentrionalis*, but differing as follows: subglabrous; more markedly stoloniferous than *R. septentrionalis*, basal leaves simple or of 3 leaflets, these more shallowly and sharply lobed and toothed than in var. *typicus*, crenate or serrate, sepals reflexed or spreading; achenes 5-15, the bodies obovate to suborbicular, 3.5-4.3 or 5 mm. long, 3.3-4 mm. dorsoventrally including the winged keels, which may be up to 1 mm. broad, the achene beaks about 2 mm. long; fruiting receptacle 4-5 mm. long.

Marshy ground at low elevations in the Deciduous and Riverbottom forests. Wyandotte County, Kansas, and possibly Iowa and eastward to Indiana, and southward to eastern Texas, Arkansas, Kentucky, and Alabama; Atlantic Coastal Plain from Maryland to Georgia; northern Florida. May and June.

The subglabrous vegetative parts serve fairly well for distinction of nonfruiting specimens from *R. septentrionalis*, but the degree of intergradation, if any, between the two species is difficult to determine without extensive field studies along the overlapping geographical zone, and specimens lacking mature carpels may not have been determined always with accuracy. For this reason the writer is hesitant to assign this entity specific rank as *R. carolinianus*, although apparently it deserves such recognition. Certainly the fruiting char-

acters, if truly constant, are outstanding. Otherwise this plant should be considered as *R. septentrionalis* var. *pterocarpus*.

Distinction of *R. carolinianus* from southeastern Coastal Plain and adjacent highland types of *R. hispidus* is not always easy in early season specimens lacking stolons and fruits. The previous interpretations of *R. palmatus* have involved an unnatural assemblage of small forms of *R. carolinianus* (with relatively small fruit and with the wings either narrower than the average or immature) with forms of *R. hispidus* having similar vegetative characters.

Significant specimens.—KANSAS: WYANDOTTE CO. *Hitchcock 1105, NY, GH, RM, Mo, US.*

IOWA: The following collections appear to be *R. carolinianus*, but distinction from *R. septentrionalis* is not certain for lack of good fruits: CLAY CO. Grove Township, *A. Haydon 5056, Mo.* POLK CO. Des Moines, *Tomlin (?) 485* in 1897, *Mo.* STORY CO. *Ames, Ball & Preston 465, Mo.*

OKLAHOMA: CRAIG CO. Vinita, *Carleton 29* in 1891, *US.* MCCURTAIN CO. Boss, Red River Bottom, *Houghton 3732½, NY*, photograph *Pom-B, GH, Mo* (type and isotypes of var. *pterocarpus*, cf. below).

TEXAS: Numerous collections from eastern Texas.

ALABAMA: MONTGOMERY CO. Catoma Creek, *Harper 85* in 1906, *NY, GH, US.* Other collections from Alabama are in doubt for one reason or another.

The following collections from the Atlantic Coastal Plain are clearly of the larger-flowered and larger-fruited type found in the southern portion of the Middle West and in Oklahoma, Texas, Alabama, or the border states; many of the other collections from the Coastal Plain appear to belong to a smaller form, possibly to be considered as a variety: MARYLAND: GARRETT COUNTY Hutton's Switch, *J. D. Smith* in 1882, *US.* DISTRICT OF COLUMBIA: Washington, *Kearney* in 1897, *US.* VIRGINIA: Various collections by Fernald et al. including, for example, the following: Meherrin River above Haley's Bridge, *Fernald & Long 7028, GH, Mo, US, 7831, GH, US.* NORTH CAROLINA: Wilmington, *C. S. Williamson*, April 18, *PA;* Columbus, Townsend in 1899, *WSC.* GEORGIA: CLARKE COUNTY Athens, *Miller & Maguire 618, Utah.* CHATHAM COUNTY Hutchinson Island, Savannah, *Miller & Maguire 617, Utah, Pom.*

Type collection.—(1) *R. carolinianus*, "Hab. in Carolina inferiore. *Bosc.*" (2) *Var. pterocarpus*, "Wet soil, Red River bottom near Boss, McCurtain County, Oklahoma, *H. W. Houghton 3732½*, May 23, 1916. Type in the New York Botanical Garden. An isotype is in the Gray Herbarium." Type *NY*, photograph *Pom-B;* isotypes, *GH, Mo* (the latter with no fruit).

18 RANUNCULUS HISPIDUS Michx.

Hirsute terrestrial perennials; roots usually fleshy, commonly 1.5-2.5 mm. in diameter; stems suberect, typically somewhat bulbously thickened at the bases, but often not so, not rooting adventitiously, 2-3.3 dm. long, usually 1-3 mm. in diameter, usually 1-6-flowered, slightly to distinctly fistulous, hirsute, the hairs spreading or appressed; basal leaf blades pinnately compound, or simple and 3-parted, cordate-ovate in outline, laciniate to broadly and shallowly lobed, 1.5-9 cm. long, 2-11 cm. broad, the leaflets parted or lobed, the petioles 5-20 cm. long, the stipular leaf bases usually 2-3 cm. long, narrow,

not free apically; cauline leaves alternate, the bracts of 1-3 elongate divisions, often petioled; pedicels 1-10 cm. long in flower, 3-13 cm. long in fruit, appressed-pubescent; sepals 5, yellowish-green, spreading, ovate, 4-6 mm. long, 2.5-3 mm. broad, pilose dorsally, attenuate, half the length of the petals, promptly deciduous; petals 5, yellow, obovate-oblanceolate, 9-13 mm. long, 4-7 or rarely 3 or 11 mm. broad, the nectary scale glabrous, free nearly its whole length, truncate; stamens about 40-60; achenes 12-35 in a usually ovoid head 6-10 mm. long and 6-8 mm. in diameter, each achene obovate, 2-3.5 mm. long, 2.5-3 or 3.5 mm. dorsoventrally, 0.7 mm. laterally, smooth, gabrous, the margin narrowly-keeled, the beak slender, 1-2 mm. long, straight; receptacle fusiform or cylindroid, 1-2.5 mm. long in flower, 4-8 mm. long in fruit, sparsely hispidulous.

This species, as pointed out by Fernald, may be distinguished from *R. septentrionalis* by the narrower stipular leaf bases. Distinction of herbarium specimens without use of this character often is difficult, since many collectors overlook stolons.

18a RANUNCULUS HISPIDUS var. **typicus,** nom. nov.

R. hispidus Michx. Fl. Bor. Amer. 1: 321. 1803. *R. repens* L. var. *hispidus* Chapm. Fl. S. U.S. ed. 1. 8. 1860. *R. hirtipes* Greene, Ottawa Nat. 16: 32. 1902.

Stems 1.5-3 mm. in diameter, fistulous, hirsute, the hairs sometimes appressed in specimens from especially Ontario, New York, and eastern Pennsylvania; basal leaf blades nearly always pinnately compound, cordate-ovate in outline, 4-9 cm. long, 5-11 cm. broad, laciniate, the parts sharply lobed or serrate-lanciniate, the blades proximally subcordate and distally acute, appressed-hirsute, the hairs rarely abundant; achenes obovate, 2.3-3 or 3.5 mm. long, 1.8-3 or 3.5 mm. dorsoventrally, 0.7 mm. laterally, the beak slender, 1-2 mm. long.

Moist places in meadows and rich woods at low elevations in the Deciduous Forest. North Dakota (Valley City), and Nebraska (Newark), to Ontario, Massachusetts, Missouri, Arkansas, Tennessee, Alabama, and southern New York; less common southward along the Atlantic Coast to South Carolina (Andersonville) and Georgia (Atlanta). April and May.

Significant specimens.—NORTH DAKOTA: BARNES CO. Valley City, *Perrine* in 1900, *NY*.

SOUTH DAKOTA: BROOKINGS CO. Brookings, Lawrence in 1896, *US* (multipetalous plant; possibly *R. septentrionalis*).

NEBRASKA: Newark, *Hapeman* in 1892, *NY*.

Type collections.—(1) *R. hispidus*, "HAB. in umbrosis sylvis Carolinae inferioris." Tracing of type, *NY;* possible isotype, *PA* (not numbered), photograph *Pom-B.* (2) *R. hirtipes*, "Obtained in woods near Sandwitch, Ontario, 5 June, 1901, by Mr. John Macoun . . . bearing the Canad. Geol. Survey number 33,582." Type *HGr 2619;* isotype, *Can*, photograph, *US*. A dissected-leaved form with the flowers small and the stems and petioles remarkably retrorsely hispid. Possibly of varietal status.

18b **Ranunculus hispidus** var. **marilandicus** (Poir.) L. Benson, comb. nov. (Liberal policy: *R. marilandicus* Poir.)

R. marilandicus Poir in Lam. Encyc. Meth. 6: 126. 1804. *R. trifoliatus* Muhl. ex Schlect. Animad. Ranunc. 2: 30. *pl. 2.* 1820. *R. palmatus* Ell. Sketch. 2: 61. 1816.

R. Schlectendalii Hook. Fl. Bor. Amer. 1: 21. 1829. *R. septentrionalis* Poir. var. *marilandicus* Torr. & Gray, Fl. N. Amer. 1: 21. 1838. *R. repens* L. var. *hispidus* (Michx.) Chapman f. *Schlectendalii* F. Kurtz in Engl. Bot. Jahrb. 9: 358. 1894. *R. cardiopetalus* Greene, Ottawa Nat. 16: 32. 1902. *R. hispidus* var. *falsus* Fern. Rhodora 22: 30. 1920.

Stems 1-2 mm. in diameter, almost always appressed- or spreading-pubescent to subglabrous, the hairs softer and the stems less markedly fistulous than in var. *typicus;* basal leaf blades either simple and 3-parted or, if compound, the leaflets usually sessile and close to one another, less dissected than in var. *typicus*, usually 1.5-4 mm. long, 2-5 mm. broad, but occasionally larger; fruit smaller than in var. *typicus* and with a narrower keel, mostly 2-2.5 mm. long, 1.8-2.3 or 2.5 mm. dorsoventrally.

Dry or rocky woodland at low elevations in the Deciduous Forest, from Toledo, Ohio, to Tennessee; Ontario to southwestern Vermont, Massachusetts, and Washington, D. C.; somewhat modified in Kentucky, most of Tennessee, Alabama, the Carolinas, Georgia, and northern Florida. April and May.

This variety is marked by small and most commonly simple, 3-lobed leaves and small fruit.

Significant specimens.—ONTARIO: Toronto, *W. Scott* in 1896, *Geol. Surv. Can. 13441;* Whirlpool Rapids, Niagara, *Macoun* in 1901, *Geol. Surv. Can. 33581, HGr,* photographs *GH* and *Pom-B, Can, GH, Mo, NY,* photograph *Pom-B* (type and isotypes of *R. cardiopetalus*, cf. below).

OHIO: LUCAS CO. Toledo, *Young* in 1884, *GH.*

KENTUCKY: Robard's (?), *W. A. Anderson 7* in 1923, *GH.* CARTER CO. Cascade Caverns, *Braun,* specimen sent on loan by Dr. E. Lucy Braun.

TENNESSEE: PICKETT CO. Rock Creek, *Braun,* specimen sent on loan by Dr. E. Lucy Braun.

Type collections.—(1) *R. marilandicus,* "Cette plante croîte au Maryland . . . in herb. Bosc." (2) R. trifoliatus, ". . . Herbarii Wildenovii species a Muhlenbergio missa. . . ." (3) *R. palmatus,* "Grows in St. John's Berkley." Near Savannah, Georgia. Type in the Charleston Museum. Photographs, *GH, Pom-B, US.* The following specimen is an excellent match for the type photograph: Hendersonville, Biltmore Herbarium 12290, May 26, 1898, *US 335422.* (4) *R. Schlectendalii,* "R. fascicularis, *Schlect. Animadv.* [*Ranunc.*] Sect. 2. p. 30. t. 2. . . . Eastern declivity of the Rocky Mountains, between lat 52° and 55°, in rich soils: plentiful. *Drummond.* — This plant agrees in every particular, as far as I can judge without fruit, with the description and figure above quoted of Schlectendal's *R. fascicularis,* except that his figure represents a slenderer plant, and one of the leaves has the middle lobe petioled, and the calyx reflexed. . . ." Asa Gray, Proc. Amer. Acad. 21: 372-3, 376. 1886, designated Schlectendal's specimen as lectotype for *R. Schlectendalii.* (5) *R. cardiopetalus,* "At the Whirlpool Rapids, Niagara, Ont., 21 May, 1901, John Macoun (n. 33,581)." Type *HGr 2546* (petals emarginate), photographs, *GH, Pom-B;* isotypes, *Can, GH, Mo, NY,* photograph *Pom-B.* (6) Var. *falsus* "Dry wooded calcareous bank, Sheffield, May 30, 1919. Bean & Fernald. (TYPE in Gray Herb.): Type, *GH,* photograph *Pom-B.*

18c RANUNCULUS HISPIDUS var. EURYLOBUS *L. Benson,* Bull. Torrey Club 68: 488. 1941

(Liberal policy: this epithet recombined in specific rank)

Stems 1.2-2 mm. in diameter, very densely hirsute, the spreading hairs 2 mm. long; basal leaf blades mostly simple, the leaflets when present sessile and usually close to one another, the simple leaves lobed or divided, the leaf-

lets or lobes or the whole leaf tending to be very broad or even orbicular, the leaf or leaflet rounded at the base, 2-5 cm. long, 2-5 cm. broad.

Hill country toward the interior from West Virgina and from Maryland to Georgia and Alabama; Monterey, Tennessee; occurring in modified form in West Virginia, southeastern Kentucky and eastern Tennessee. March and April.

Specimens examined.—MISSOURI: McDONALD CO. A plant somewhat like this variety collected 2 miles west of Mountain, *Steyermark 4497* in 1937, *Mo 1196620.*

WEST VIRGINIA: CABELL CO. Milton, *L. Williams 411, NY.*

KENTUCKY: HARLAN CO. Pine Mountain, *W. Stone* in 1919, *PA.*

TENNESSEE: FRANKLIN CO. Sewanee, *Svenson 7527, Mo, PA.* GRUNDY CO. Mont Eagle, *Richards* in 1930, *Utah.* MARION CO. Lookout Mountain, *Churchill* in 1906, *Mo.*

ALABAMA: TUSCALOOSA CO. Warrior River, Tuscaloosa, *Harper 3014, NY, Mo, PA, GH* (tending to var. *marilandicus*). CULLMAN CO. St. Bernard, *W. Worf* in 1924, *Clo.* LEE CO. Auburn *Earle & Baker* in 1897, *NY, GH* (tending to var. *marilandicus*), in 1898, *Ill, US* (?), *RM.*

MARYLAND: PRINCE GEORGE CO. East of Marlboro, *Morris 1398, Pom-B.*

DISTRICT OF COLUMBIA: Southeastern Washington, *Blanchard* in 1891, *Mo;* Rock Creek, *T. A. Williams* in 1898 (not extreme, tending to var. *marilandicus*), *DS, RM.*

VIRGINIA: FAIRFAX CO. Arlington, *Blanchard* in 1891, *Mo, NY;* Fort Myer, *Mearns* in 1895, *NY.* BRUNSWICK CO. Meherrin River 8 miles southeast of Cohran, *Fernald & Long 7027, GH;* Triplett, *Fernald & Lewis 14535, GH;* Rattlesnake Creek below Wright's Bridge, *Fernald & Lewis 14534, GH.* SOUTHAMPTON CO. *Fernald & Long 7832, GH.*

NORTH CAROLINA: POLK CO. Tryon Mountain, *Huger* in 1896, *NY.* ORANGE CO. Chapel Hill, *Ashe, US.* HALIFAX CO. *Weldon,* Roanoke River, *Small* in 1897, *NY.*

SOUTH CAROLINA: OCONEE CO. Clemson College, *House 1712, NY, Mo, US.* ANDERSON CO. Andersonville, *Earle* in 1886, *NY;* Anderson, *E. L. Davis* in 1911, *Ill, J. Davis* in 1910, *US,* in 1913, *Mo, 2373* in 1920, *Mo, US.* LEXINGTON CO. Irmo, *Palmer 39962 US* (?).

GEORGIA: COBB CO. Large Knob, Kenesaw Mountain, *Perry & Myers* in 1934, *NY.* HARALSON CO. Tallapoosa, *Way 54* in 1900, *US.* GWINNETT CO. Thompson Mills, *Allard 47* in 1908, *NY.* CLARKE CO. Georgia State College of Agriculture Farm, *Miller & Maguire 620, Utah, 630, Utah;* Lumpkin Hill, Athens, *Miller & Maguire 629, Utah;* Princeton, Oconee River, *Miller & Maguire 619, Utah.* RICHMOND CO. Augusta *Cuthbert* in 1899, *NY, Fla* (type and isotype, cf. below).

Type collection.—"Oak woods, dry, Augusta, Georgia, March 26, 1899. TYPE in the New York Botanical Garden. [Photograph, *B.*] Unfortunately the collector's name is not on the specimen, which is labelled in pencil, Although the variety has been collected rather frequently, no other specimen is suitable for a type." Type, *NY,* photograph *Pom-B.* An almost certain isotype is the following: Oak woods, Augusta, Ga., March 1899, *A. Cuthbert, Fla 8867.* Another sheet, probably a duplicate and therefore an isotype, is labelled, "Rich woods near lake, Augusta, Ga.," *A. Cuthbert,* March, 1899, *Fla 8868.*

18d **Ranunculus hispidus** var. **Greenmanii** L. Benson, var. nov.
(Liberal policy: specific rank)

Stems 1.5-3 mm. in diameter, wiry, appressed-hirsute; basal leaf blades pinnatifid or pinnate, divided into 3 segments, or 3-foliolate, subreniform in outline, 8-10 cm. long, 12-16 cm. broad, the leaflets or divisions narrowly elliptic to oblanceolate-obovate or obovate, sharply serrately toothed or partly

shallowly lobed, thick and more coriaceous than the other varieties, appressed-hirsute; achene smaller than in var. *typicus*, about 2 mm. long.

Caulibus 1.5-3 mm. diametro, hirsutis, pilis appressis; foliis 8-10 cm. longis, 12-16 cm. latis; pinnatifidis vel pinnatis, 3-foliolatis vel in 3 segmenta oblanceolata-obovata vel obovata, serrata; acheniis circa 2 mm. longis.

Woods in the mountains. West Virgina, Maryland, and North Carolina. Flowering in late summer (September and October).

Specimens examined.—WEST VIRGINIA: MCDOWELL AND RANDOLPH COUNTIES. Spruce Mountain Branch of the Condon Boom and Lumber Company Railroad, *Moore 2225, GH;* Railroad track, Allegheny Mountains (Randolph Co.) *Greenman 366, GH;* Welch, *Webb* in 1922, *GH.*

MARYLAND: GARRETT CO. *J. D. Smith* in 1880, *US* (type, cf. below).

NORTH CAROLINA: BUNCOMBE CO. Pinnacle Mt., near Tyson's Hotel, *Pollard* in 1901, *US* (modified form, the leaves thinner).

Type collection.—Garrett County, Maryland, *John Donell Smith*, Oct. 5, 1880, *US 1391426* (type), photograph *Pom-B.*

19 RANUNCULUS PETIOLARIS H. B. K.

Hirsute to hispid terrestrial to subpalustrine or palustrine perennials; roots not thickened, 1-2 or 2.5 mm. in diameter; stems reclining or perhaps sometimes suberect, the flowering stems rooting at the nodes or producing stolons, freely branching, somewhat fistulous, distinctly hirsute to hispid; basal leaf blades simple and 3-parted to pinnately or subpalmately compound, 4.5-10 or 12 cm. long, 5.5-12 or 14 cm. broad, the blade proximally cordate, the leaflets or parts distally acute, sparsely hirsute; pedicels 2-8 or up to 15 cm. long in flower, 5-10 or up to 20 cm. long in fruit with long appressed hairs; sepals 5, greenish-yellow, reflexed, ovate-lanceolate but with the tips blunt or rounded, 6-8 mm. long, about 3 mm. broad, sparsely hispid, half or three-fifths the length of the petals, promptly deciduous, petals 5-13, obovate-cuneate, oblanceolate, or narrowly oblong, apically rounded, truncate, or emarginate, 6-14 mm. long, 2-7 mm. broad, the nectary scale large; stamens 25-40; achenes 15-25 in subglobose head 8-10 mm. long and 8-10 mm. in diameter, each achene nearly circular or broadly obovate, usually 3-3.5 or up to 4 mm. long, 2.5-3 mm. dorsoventrally, 1-1.5 mm. laterally, smooth or with large papillae, the papillae sometimes produced into appressed stout hairs, the margin bevelled, the beak slender, 1.8-4 mm. long, straight; receptacle subcylindroid, 1-2 mm. long in flower, 3-4 mm. long in fruit, hirsute or sometimes with only a few hairs.

Since many collectors fail to look for stolons or for adventitious roots on the lower nodes of the main stems, classification of the Mexican and Central North American members of the *Ranunculus septentrionalis* complex is handicapped in the same manner as determination of specific lines among the members of the same group occurring in the eastern United States. Among the various species groups of *Ranunculus* occurring north of Mexico, capability of the plants to produce roots at the nodes of the stems or lack of it is a character of unfailing constancy in all of the cases the writer has had an opportunity to investigate thoroughly in the field. Although it does not follow necessarily that this is true throughout the genus,

it is with only slight reservations that the character of adventitious rooting is assigned as a mark of *R. petiolaris*. Lack of rooting is a distinctive character of *R. geoides* and *R. pilosus*. It is hoped that future collectors having an opportunity to study adventitious rooting in the field will check carefully for stolons and for roots on the lower nodes of the flowering stems and will see that these structures are included in their specimens. Furthermore, the writer would appreciate having reports from collectors who have an opportunity for detailed field study on various members of the species complex.

TABLE 6.—Varieties of *Ranunculus petiolaris* H. B. K.

Var. *typicus*	Var. *sierrae-orientalis*	Var. *Hookeri*	Var. *Mexiae*
Basal leaf blades simple and deeply 3-parted to pinnately or subpalmately compound, 4.5-10 or 12 cm. long, 5.5-12 or 14 cm. broad, the terminal leaflet broadly ovate, 3-cleft or -parted, the 2 lateral leaflets asymmetrically cleft; petioles 10-20 or 25 cm. long.	Basal leaf blades somewhat similar to var. *typicus*, often thinner and with the minor lobes or teeth broader and more rounded, the divisions or leaflets usually ovate or ovate-lanceolate and merely toothed or lobed; petioles as in var. *Hookeri*.	Basal leaf blades similar to var. *typicus*, petioles 4-8 or 15 cm. long.	Basal leaf blades simple, palmately 5-parted, 6-7 cm. long, 6.5-9 cm. broad; petioles about 10-13 cm. long.
Cauline leaves well-developed, those well above the stem base usually as large as the basal and similar to them or often of 3 ovate-lanceolate toothed, or slightly lobed leaflets or segments.	Cauline leaves as in var. *typicus*.	Cauline leaves similar to the basal.	Cauline leaves except those above the short basal internodes reduced to minute linear or subfiliform divisions, the stems nearly bare except at the bases.
Petals 5, obovate or obovate - cuneate, apically truncate or emarginate, 8 - 10 mm. long, 4-5 mm. broad.	Petals 5, cuneate-obovate, commonly emarginate, 10 - 14 mm. long, 5-7 mm. broad.	Petals 7 (?) or 8-13, narrowly oblong-cuneate, apically truncate, 10-12 mm. long, 3-4 or rarely 5 mm. broad.	Petals 10-13, oblanceolate, 6 - 8 mm. long, 2-2.5 mm. broad.
Achenes smooth or with large papillae, glabrous.	Achenes papillate, the papillae produced into stout appressed hairs.	Achenes as in var. *typicus*, rarely with hairs from 1 or 2 papillae.	Achenes smooth, glabrous.
Sierra Madre Occidental and southern edge of Mexican Plateau.	Sierra Madre Oriental.	Durango to Hidalgo and Chiapas.	Sierra Madre Occidental in Jalisco.

19a **Ranunculus petiolaris** var. **typicus,** nom. nov.*

R. petiolaris H. B. K. ex DC. Syst. 287. 1818.

Pine or oak woods at 3,000 to 7,000 feet elevation (at lower altitudes than var. *Hookeri*). Mexico in the Sierra Madre Occidental and in the mountains along the southern edge of the Mexican Plateau from Sinaloa to Colima, Guerrero, and Vera Cruz. Flowering from March until October and perhaps throughout the year.

Specimens examined.—MEXICO. SINALOA: Sierra Monterey, *Gentry 5877, UA-Shr;* Ocurahui, Sierra Surotato, *Gentry 6285, GH, NY, 6309, GH.*

JALISCO: La Palma *M. E. Jones* in 1892, *Pom.*

COLIMA: Volcano of Colima, *M. E. Jones* in 1892, *Pom.*

MICHOACÁN: Cerro Azul near Morelia, *Arséne* in Aug., 1910, *NY, Pom-B.* in Oct., 1910, *F, 3377, US, Mo, 5508, US, NY, GH, Mo, Ill, 6796, Mo, US;* Campanario near Morelia, *Arsène 8468, US, F, NY, Ill;* Zitacuaro, *Hinton 11904, GH, 13003, GH.*

HIDALGO: Between Tianguistengo and Rio de los Naranjos, Zacualtipan, *H. E. Moore, Jr. 1917, Pom.*

MEXICO: Carboneras, Rio Verde, Dist. of Tiemascaltepec, *Hinton 7715, F, NY, UA-Shr, US, Mo,* the best match for the type as represented by H. B. K. Nov. Gen. et Sp. 5: *pl. 428.* 1821; Laguna Zimpoala, *Barkley, Webster, & Rowell 7407, Pom;* Comunidad, Temascaltepec, *Hinton 7701, US;* Urupán, *Fisher 45121* in 1945, *US.*

GUERRERO: Los Barrales, 950 m., *Hinton 14389, GH.*

Type collection.—"Hab. in Mexico prope Santa Rosa [Vera Cruz]. Humb. et Bonpl. . . ." The plant figured by H. B. K., Nov. Gen. et Sp. Pl. 5: 45. *pl. 428.* 1821, has short achene beaks in the enlargement of the fruits, but this may be due to the breaking of the styles in the herbarium specimens. *R. Aschenbornianus* Schauer, Linnaea 20: 719. 1847, may be a synonym of var. *typicus* or var. *Hokeri.* This type has not been seen, and placing the name here is based merely upon Schauer's statement. "R. petiolari . . . affinis. . . ." R. Galeottii Turcz. Bull. Soc. Nat. Mosc. 27: 276. 1854 appears to be a synonym for either var. *typicus* or var. *Hookeri* or likely for *R. pilosus.* The type was collected in "Mexico, Oaxaca, alt. 7-000-9,000 ped. Galeotti n. 4,567." The fruit was reported to be with tubercles on the sides.

19b **Ranunculus petiolaris** var. **sierrae-orientalis** L. Benson, var. nov.*
(Moderate policy: specific rank)

Partibus primariis foliorum-ovatus-acutis vel ovatis-lanceolatis, crenatis vel subintegris; petalis 5, cuneatis-obovatis saepe emarginatis, 10-14 mm. longis, 5-7 mm. latis; acheniis hispidis-papillatis pilis appressis.

Rich woods in the Sierra Madre Oriental at 2,500 to 8,000 feet elevation. Nuevo Leon and Tamaulipas, northeastern Mexico. Flowering from January until August and perhaps longer.

Specimens examined.—MEXICO. NUEVO LEON: Sierra Madre above Monterrey, *Pringle 10194, F, UC, GH, US, NY, Crn, Mo, PA,* the last five sheets with smooth, glabrous achenes, the other three having hairs on the pistils; Monterrey, *Tharp 1831, US, Tex, Chambers* in 1935, *Tex;* Horsetail Falls, 25 miles southeast of Monterrey, *Buchholz* in 1936, *Ill;* 27 miles southeast of Monterrey, *Palmer* in 1880, *GH;* Sierra Madre beyond Puerta near Monterrey, *C. H. & M. T. Mueller 39, GH, F, Tex, 39B, F;* Pablillo, Galeana, *Pennell 17029, US, 17066, PA, Taylor 187* in 1936, *DS, Pom-*

* Cf. Table 6.

B, Mo, Tex, GH, F; San Francisco Canyon, 15 miles southwest of Pueblo Galeana, *C. H. & M. T. Mueller 299, GH, F, Tex, Mich.*

TAMAULIPAS: Santa Rita Ranch, *Runyon 881, US, Tex* (as *Runyon & Tharp*) (stems clearly stoloniferous); San Juan, *Kemp* in 1902, *NY* (type, cf. below).

Type collection.—San Juan, Tamaulipas, *J. F. Kemp*, Jan. 1902. Type in the Herbarium of Columbia University, New York Botanical Garden, mounted on 2 herbarium sheets, photographs *Pom-B.*

19c **Ranunculus petiolaris** var. **Hookeri** (Schlect.) L. Benson comb. nov.*
(Liberal policy: *R. Hookeri* Schlect.)

R. Hookeri Schlect. Linnaea 9: 610. 1834, not Regel in 1861, not *R. Purshii* var. *Hookeri*, D. Don in 1831.

Wet ground of ditches, meadows, and lake borders at mostly 5,000 to 8,000 feet elevation or occasionally up to 10,500 feet. Mexico from Sinaloa and Durango to Hidalgo and southward to northern Guererro, western Vera Cruz, and Chiapas. The commonest and most widespread variety.

Specimens examined.—MEXICO: STATE UNKNOWN: *Sessé, Mociño, Castillo, & Moldonado* in 1787, 1795, or 1804, *F; Woelflin* in 1845, *NY.*

SINALOA: Cerro Quemado, northeast of Panuco, *Pennell 20139, US;* Cerro de la Sandia, northeast of Panuco, *Pennell 20088, US.*

DURANGO: San Ramón, *Palmer 188* in 1906, *GH, F, NY, US,* a form with simple, rather thick leaves; El Salto, *Pennell 18304, US.* Pineland, *Pennell 18409, PA, US.*

NAYARÍT: Tepíc, *Pennell 19934, US.*

JALISCO: Ferreria, *M. E. Jones 706* in 1892, *Pom.*

MICHOACÁN: Patzcuaro, *Pringle 4133, GH, F, NY, US, UA-Shr, UC, Mo, PA, Mich;* Morelia, *Arsène 6921, US;* Tancitaro, *Leavenworth 251, F, UA-Shr, Mo, USNA, Ill, 251, NY, F, UA-Shr, Mo, USNA, Ill, GH, 4030, Mo, Ill;* S. Naranjillo, Coalcomán, *Hinton 13924, GH, US;* S. Torricillas, Coalcomán, *Hinton 13985, GH, US,* transitional to var. *typicus.*

HIDALGO: Zimapán, *Coulter 650, GH, PA, NY.*

MEXICO: *Barkley, Rowell, & Webster 2200, Pom;* Sierra Pelado, *Barkley, Rowell, & Webster 2229, Pom;* Sierra de Ajusco, *Rose & Hay 5531, US;* 55 km. southeast of Mexico City, *Weaver 703, Pom-B;* mountains between Toluca and Mexico City, *Rusby 307* in 1910, *NY, US;* Valley of Mexico, *Borgeau 759* in 1865-6, *GH, F;* Ixtaccihuatl, *Purpus* in 1903, *UC;* below Mt. Popocatepetl, *Balls 5163, UC, US;* Amecameca, *Fisher 307* in 1924, *US, Mo, F;* Toluca, *Schery 54* in 1941, *Mo, Mich, US;* Mexico City to Cuernavaca, *Bailey 324* in 1935, *F; Acopilco, Lyonnet 97* in 1927, *US* (in part).

MORELOS: El Parque, *Rose & Rose 11112, US, NY* (petals 7 mm. broad!); Tres Cumbres, *Kenoyer* in 1938, *UA-Shr;* Tres Marias-Cuernavaca, *Lyonnet* 583 in 1930, *Mo, US;* Cuernavaca Road, *Kenoyer A479* in 1938, *F;* 20 miles north of Cuernavaca, *Barkley & Webster 2260, Pom.*

PUEBLA: Tesmalaquilla, *Balls 4477, US, UC;* Huauchinango, *Asplund 949, F, NY;* Honey Station, *Pringle 11914, US, GH, F, Crn;* Rio Frio, *Rowell, Webster, & Parkley 17N368, Pom.*

VERA CRUZ: Jalapa, *Weaver 909, Pom-B, MacDaniels 859, F;* San Miguel, *Balls 4723, US, UC.*

GUERRERO: Taxco, *Abbott 153* in 1936, *GH,* transitional to var. *typicus;* Los Barrales, 1750 m., *Hinton 14397, GH.*

* Cf. Table 6.

OAXACA: Cerro de Buena Vista, *Seler 99* in 1888, *GH*.
CHIAPAS: *Ghiesbrecht 163* (leaves dissected), *GH, NY, Mich.*

Type collection.—"In graminosis prope Jalapam Majo. 29. atque pr. Hac. de la Laguna Jul. 29" On herbarium specimens the name *Ranunculus Hookeri* has been used for practically every plant in the complex of species.

19d **Ranunculus petiolaris** var. **Mexiae** L. Benson, var. nov.*
(Liberal policy: specific rank)

Foliis radicalibus orbiculatis, 5-partitis, 6-7 cm. longis, 6.5-9 cm. latis; foliis superioribus minutis linearibus vel subfiliformibus; petalis 10-13, oblanceolatis, 6-8 mm. longis, 2-2.5 mm. latis; acheniis laevibus glabris.

Known from only the type collection. Open hillside, San Sebastian, Arroyo de las Castillas, Sierra Madre Occidental, Jalisco, Mexico, *Ynes Mexia 1478*, Jan. 14, 1927. Type in the Gray Herbarium. Isotypes: *NY, US 1318719, F 711230, USNA 42562, UC 350352, Mo 970767, Mich, CAS 156924, DS 182676.* Photograph of type, *Pom-B.*

20 RANUNCULUS GEOIDES H. B. K.

Hirsute subterrestrial perennials; roots somewhat thickened into elongated storage organs; stems tending to be leafless above, reclining to prostrate, not rooting, 1-7 dm. long, 1-4 or 5 mm. in diameter, freely branching to simple, slightly or clearly fistulous, hirsute; radical leaf blades simple to pinnately compound, longer than broad to about as long as broad, 1.5-9 cm. long, 1.5-8 cm. broad, the blade proximally cordate and the segments or leaflets usually obtuse or rounded; petioles 3-25 cm. long, hirsute to glabrous; cauline leaves few, reduced; pedicels 2-11 cm. long in flower, 4-22.5 cm. long in fruit, prevailing long in proportion to the stems, appressed-pubescent; sepals 5, greenish-yellow, reflexed, ovate-lanceolate, 5-6 mm. long, about 3 mm. broad, sparsely hirsute, half or two-thirds the length of the petals, promptly deciduous; petals 5-12, oblanceolate to obovate-cuneate, 8-12.5 mm. long, 2-8 mm. broad; stamens 20-25; achenes 10-15 in a hemispheriodal head 5-6 mm. long and 6-8 mm. in diameter, each achene discoid, somewhat turgid, 2.5 mm. long, 2 mm. dorsoventrally, 1-1.5 mm. laterally, smooth, glabrous, the margin not conspicuous, the beak slender, about 2 mm. long, straight; receptacle subcylindroid, 1-2 mm. long in fruit, hispid.

20a RANUNCULUS GEOIDES var. **typicus.** nom. nov.*

R. geoides H. B. K. ex DC. Syst. 293. 1818, not Siev. in 1794 nom. nud. *R. longepedunculatus* Scheidw. Hort. Belge 5: 163. *pl. 9.* 1838. *R. mexicanus* Davis, Minn. Bot. Studies 2: 487. 1900.

High mountains of southern Mexico at 10,000 to 11,000 feet elevation. Michoacán to Hidalgo and western Vera Cruz and Oaxaca.

Specimens examined.—MEXICO. STATE UNKNOWN: *Sessé, Mociño, Castillo & Moldonado* in 1787, 1795, or 1804, *F.*

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* Cf. Table 6.
* Cf. Table 7.

TABLE 7.—Varieties of *Ranunculus geoides* H. B. K.

Var. *typicus*	Var. *oaxacensis*	Var. *amellus*	Var. *Standleyi*
Largest roots 2-3 mm. in diameter.	Largest roots 2.5-4 mm. in diameter.	Largest roots 1-2.5 mm. in diameter.	Largest roots 3-5 mm. in diameter.
Stems mostly 2-5 dm. long at fruiting time.	Stems 1-4.5 dm. long at fruiting time.	Stems 1-1.8 dm. long at fruiting time.	Stems mostly 3-7 dm. long at fruiting time.
Short lower internodes with spreading hairs.	Short lower internodes with only moderately dense spreading hairs.	Short lower internodes glabrous or sparsely appressed-hirsute.	Short lower internodes hoary with dense appressed long hairs.
Basal leaf blades cleft or parted into 3 segments, about as long as broad, the segments broadly cuneate-obovate or nearly orbicular, similar to *R. occidentalis* Nutt., 1.5-4 cm. long.	Basal leaf blades ranging from the type in vars. *Standleyi* and *amellus* to that in var. *typicus*, even on a single plant.	Basal leaf blades as in var. *Standleyi* but smaller, 2-5 cm. long, 1.5-4 cm. broad.	Basal leaf blades pinnate, longer than broad or sometimes as long as broad, with 3 or mostly 5 leaflets, 2 or 4-9 cm. long, 1.5 or 3-8 cm. broad, lacerately parted and cleft.
Leaves hirsute.	Leaves hirsute.	Leaves rather sparsely hirsute along the veins.	Leaves hirsute.
Petals as in var. *Standleyi*.	Petals 5, obovate-cuneate, 10-12 mm. long, 6-8 mm. broad.	Petals as in var. *Standleyi*.	Petals 7 or 8-12, oblanceolate, 8-12.5 mm. long, 2-4 mm. broad.
Michoacán to Vera Cruz and Oaxaca.	Oaxaca.	Hidalgo to Mexico and Vera Cruz.	Guatemala.

MICHOACÁN: Cerro de los Carpinteros, Zitácuaro, *Hinton 11987, GH.*

MEXICO: San Miguel, *Lyonnet 1497, US;* Cerro San Miguel, *Salazar* in 1912, *US;* Ajusco, *Lyonnet 1149, US;* Acopilco, *Lyonnet 97* in 1927, *NY, GH, US* (in part).

HIDALGO: Mineral del Monte, Pachuca, near Zerezo, *H. E. Moore, Jr. 3152, Pom.*

PUEBLA: Arcos, Ojo de Agua, *Balls 4765, US.*

VERA CRUZ: Mt. Orizaba, *Seaton 179* in 1891, *NY, US, GH, F, Rose & Hay 5695a, GH, 5749, US, 6345, US, Balls 4421, US, UC;* La Zimiento, Cofre de Perota, *Balls 4639, UC, US.*

OAXACA: *E. W. Nelson 1065, US,* the leaf divisions tending to be acute.

Type collections.—(1) *R. geoides*, "Hab. in Mexici montosis, Humb. et Bonpl. . . . (v. s. sp. in h. H. B.)" (2) *R. longepedunculatus*, ". . . M. Galeotti du Mexique où ella croît aux environs de Real del Monte. . . ." (3) *R. mexicanus*, nom. nov. for *R. geoides*. This name is unnecessary since *R. geoides* Siev. is a nomen nudum and not validly published. The writer wishes to express gratitude to Miss Marjorie W. Stone of the Gray Herbarium for checking this matter, since the original publication is not directly available.

20b **Ranunculus geoides** var. **oaxacensis** (Briq.) L. Benson, comb. nov.*
(Liberal policy: *R. oaxacensis* Briq.)

R. oaxacensis Briq. Ann. Conserv. & Jard. Bot. Geneve 11 & 12: 179. 1908.

Mountain meadows at 10,000 to 12,000 feet elevation. Oaxaca, Mexico.

Specimens examined.—MEXICO. OAXACA: Sierra San Felipe, *Pringle 4718, GH, F 106324, NY,* photograph *Pom-B, US 253029,* photograph *Pom-B, UC 118313, Pom-B 268462, Mo 212051, PA, Mich, WSC 10158* (isotypes); Cerro Verde, *Purpus 3488, Mo, UC, F, NY, GH, US.*

Type collection.—"Mexicum: Civitas Oaxaca, Sierra de San Felipe, 1000', 28 jun. 1894 (Pringle n. 4718)." Isotypes as listed above.

20c **Ranunculus geoides** var. **amellus** (Briq.) L. Benson, comb. nov.*
(Liberal policy: *R. amellus* Briq.)

R. amellus Briq. Ann. Conserv. & Jard. Bot. Geneve 11 & 12: 177. 1908.

Mountains at 10,000 to 11,000 feet elevation. Mexico from Hidalgo and Mexico to Vera Cruz.

Specimens examined.—MEXICO: STATE UNKNOWN: La Cima, 10,000 ft., *Kuntze 2372g, NY.*

HIDALGO: Real del Monte, *Coulter 648, GH* (perhaps not this variety); Sierra de Pachuca, *Rose & Hay 5625, US* (in part); Mineral del Chico, Parque Nacional, *H. E. Moore, Jr. 1544, Pom.*

MEXICO: Sierra de las Cruces, *Pringle 4486, HGr, NY, GH, F 264373, UC 118319, Mo 212035, PA, Mich,* photograph *Pom-B, US 63208* (isotypes, cf. below), *5319, GH, 9319, NY, US, GH, Crn, 11912, GH, US, F, NY, Crn, Mich, Hinton 4392, Mo, UC, NY, US.*

VERA CRUZ: El Rio de Jorhe, Perote, 9,700 feet, *Balls 4539, UC.*

Type collections.—"Mexicum: Civitas mexicana, in pascuis Sierra de las Cruces, 12 Aug. 1893, fl. fr. (Pringle n. 4486)." Isotypes as listed above.

20d **Ranunculus geoides** var. **Standleyi** L. Benson, var. nov.*
(Liberal policy: specific rank)

Radicibus majoribus 3-5 mm. diametro; caulibus 3-7 dm. longis a basi hirsutis, pilis appressis; foliis oblongis, pinnatis, 2 vel 4-9 cm. longis, 1.5 vel 3-8 cm. latis; foliolis 3-5, in partes laceratis, pubescentibus; petalis 7 vel 8-12, oblanceolatis, 8-12.5 mm. longis, 2-4 mm. latis.

Mountain meadows at 8,000 to about 12,000 or 14,000 feet elevation. High mountains of western Guatemala.

Specimens examined.—GUATEMALA: DEPT. UNKNOWN: Chichoy (?) Pass, *Lewis 927, F.*

HUEHUETENANGO: Tunima, Sierra de los Cuchumatanes, *Steyermark* in 1942, *Field Mus. Exped. 48219, F, 48359, F;* Cuesta de la Concepción, *Seler 2740, US;* Chancol, Sierra de los Cuchumatanes, *Steyermark* in 1942, *Field Mus. Exped. 48253, F.*

TOTONICAPÁN: Calel, *Seler 3174, US.*

QUEZALTENANGO: Sololá, Bergwald zw. Totonicapan und Los Encuentros, *Seler*

* Cf. Table 7.

2370, GH, US; Aguas Calientes, *Seler 2887, US, GH;* Volcán Zunil, *Steyermark* in 1940, *Field Mus. Exped. 34679, F* (type, cf. below); Los Encuentros, *J. R. Johnston, 1014, F;* Volcán Santa Maria, *Steyermark* in 1940, *Field Mus. Exped. 34129, F.*

CHIMALTENANGO: Santa Elena, *Skutch 103* in 1930, *US;* Chichavac, *Skutch 360* in 1933, 510 (in part), *Mich;* Cerro de Tecpam near Santa Elena, *Standley* in 1938, *Field Mus. Exped. 58686, F, 58734, F, J. R. Johnston 400, NY, F.*

Type collections.—Wheat field, Volcán Zunil, alt. 2500-3800 m., Dept. Quezaltenango, *Julian A. Steyermark,* Jan. 22, 1940, *Field Museum Expedition No. 34679, F 1052094,* photograph *Pom-B. R. Hookeri* Schlect. f. *minor* Donn. Smith & Loes. Bull. Herb. Boiss. II. 3: 88. 1904, nom. nud., may belong to this variety, but the type has not been seen. The type collection was as follows: "Hab. in Guatamala, in dept. Huehuetenango in silva montana supra Todos los Santos et in dept. Totonicapan ad Calel: Sel. n. 2960, 3174. -Flor.: June. -Sept."

21 RANUNCULUS PILOSUS H. B. K. ex. DC. Syst. 1: 287. 1818

R. amarillo Bertol. Fl. Guatemal. 424. 1840.

Hirsute terrestrial perennials; roots fibrous, 1-2 or 3 mm. in diameter; stems suberect, not rooting, 4-7 dm. long, 3-5 mm. in diameter, freely branching, fistulous below, strongly and conspicuously hirsute; basal leaf blades pinnate, 6-16 cm. long, 4-15 cm. broad, the leaflets 3-7, the lower one petioluled, 3-parted or even again pinnate, the parts or leaflets sharply parted and toothed, hirsute but the hairs appressed, the petioles 1-3 dm. long, conspicuously hirsute; cauline leaves well-developed, the bracts of 1-3 linear segments; pedicels 2-10 cm. long in flower, 4-15 cm. long in fruit, appressed-hirsutulous; sepals 5, greenish-yellow, reflexed, ovate-attenuate, 6-7 mm. long, 2.5-3 mm. broad, thinly hispid, half or three-fifths the length of the petals, promptly deciduous; petals 5-10, oblong or narrowly so, 8-12 mm. long, 3-4 or 5 mm. broad; stamens about 30-40; achenes 10-20 in a globose head 7-8 mm. long and 7-8 mm. in diameter, each achene obovate to elliptic, 2.5-3 mm. long, 2-2.5 mm. dorsoventrally, 1 mm. laterally, sparsely papillate at maturity, glabrous, the margin moderately conspicuous, bevelled, the beak slender, 1.5-2 or 2.7 mm. long, straight; receptacle slender, 1-2 mm. long in flower, 2.5-3.5 mm. long in fruit, hispid.

Moist ground at mostly 4,000 to 7,000 or 8,000 feet elevation. Mexico from San Luis Potosí southward through western Vera Cruz and adjacent Puebla to Chiapas; western Guatemala; Costa Rica; Chiriqui Province, Panamá.

Specimens examined.—MEXICO. SAN LUIS POTOSÍ: Sierra del Alvarez, *Pennell 17793, US, PA;* in montibus *San Miguelito, Schaffner 183* in 1876, *GH;* San Luis Potosí, *Schaffner 515* in 1879, *NY, Parry & Palmer 6* in 1878, *US, PA, Mo, GH;* Alvarez, *Palmer 180* in 1902, *F, Mo, GH, US, NY, Pennell 17823, US;* San Luis Potosí to Tampico (perhap in Vera Cruz); *Palmer 1030* in 1879, *GH.*

PUEBLA: Boca del Monte, vicinity of Puebla, *E. W. Nelson 217* in 1894, *US, Arsène 1752, US;* Tazuitlán, *Orcutt* in 1910, *F, Mo.*

VERA CRUZ: Jalapa, *F. W. Johnson* in 1900, *US, Pringle 7994, Mo, US, F, GH, RM, C. L. Smith 1674 & 1745* (combined), *Mo, Rose & Hay 6091, US;* Huatusco, *Rozynski 799, F, NY;* Alcuztrinco, *Mutado 1093, Mich, US;* Las Cumbres, *Langman 2225, PA;* Orizaba, numerous collectors.

OAXACA: Camaltepec, Dist. of Ixtlan, *Schultes 656a, GH;* 30 miles northwest of Oaxaca, *Rowell, Webster, & Barkley 17M545, Pom;* Oaxaca, *Conzatti & Gonzales 12* in 1900, *US;* Distrito del Centro, *Conzatti 4961, Mo;* San Felipe del Agua, *Conzatti 569* in 1895, *GH;* Cerro Buena Vista, Dist. of Elta, *Seler 99* in 1888; Totontepec,

E. W. Nelson 757 in 1894, *US;* Sierra de San Felipe, *C. L. Smith 663, Mo;* Zempoaltepec, *E. W. Nelson 555* in 1894, *US.*

CHIAPAS: *Ghiesbreght 828, GH* (parts of 2 sheets); Siltepec, *Matudo 1063, Mich;* Rio del Durazno and Santa Cruz, *Rovirosa 909, PA.*

GUATEMALA. DEPT. UNKNOWN: *Heyde 180* in 1892, *US.*

HUEHUETENANGO: Chiantala, *Standley* in 1939, *Field Mus. Exped. 65691, F,* (?) *Liebman 1049, US.* Aguacatan road 10 km. east of Huehuetenango, *Standley* in 1941, *Field Mus. Exped. 82137, F;* Cerro Pixpix, above San Ildefonso, *Steyermark* in 1942, *Field Mus. Exped. 50652, GH.*

QUICHÉ: San Miguel Uspatán, *Heyde & Lux 2971, GH, US, Pom-B, Mo, NY,* without locality, *Aguilar 808, F, 1325, F.*

CHIMALTENANGO: Las Calderas, *Standley* in 1938, *Field Mus. Exped. 57778, F, 60064, F, 60089, F;* Rio Guacalate, *Standley* in 1940, *Field Mus. Exped. 80091, F.* Chichavac Tecpan, *Salas 1394, F, Skutch 360, DS.*

QUEZALTENANGO: Los Encuentros, *J. R. Johnston 1023, F.*

ZACATEPEQUEZ: Santiago, *Gomez, 802, GH, US, Pom-B.*

ALTA VERAPAZ: Cobán *Turckheim II 1361, NY, Mo, F, Mich, GH, Standley* in 1939, *Field Mus. Exped. 69049, F, H. Johnson 626, US;* Salama, *Cook & Doyle 224* in 1904, *US;* Tactic, *Turckheim 461, NY, PA, US, F, 1661, US, GH, Standley* in 1939, *Field Mus. Exped. 69962, F, 71118, F, Muenscher 12557, Crn, F.*

BAJA VERAPAZ: San Jeronimo, *Salas 1453, F;* Santa Rosa, *Standley* in 1939, *Field Mus. Exped. 69833, F.*

GUATEMALA: San Juan Sacatépequez, *Standley* in 1938, *Field Mus. Exped. 59240, F.*

JALAPA: Potrero, Carillo, *Steyermark* in 1939, *Field Mus. Exped. 33045, F* (2 sheets); between Jalapa and Montaña Miramundo, *Steyermark* in 1939, *Field Mus. Exped. 32849, F;* Finoa Incienso, *Lewis* in 1938, *F.*

COSTA RICA: Sables du Rio Parrita du Copey, *Conduz 11873, GH, US, 12220, NY, US, Pom-B.*

PANAMÁ: Boqueli District, Chiriqui Province, *M. E. Davidson 444* in 1938, *GH.*

Type collections.—(1) "*R. pilosus,* "Hab in America meridionali circa Sante-Fez. Humb. et Bonpl. . . . (v.s. sp. in h. H. et B. et Deless.)" (2) *R. amorillo,* "Habitat in Guatemala. . . ." The type has not been seen. In a letter dated January 20, 1944, from Dr. Paul C. Standley, the following statement was made: "In the Fl. Guat. I have listed [*R. amarillo*] . . . as a synonym of *R. pilosus* DC., which may or may not be right. The type of species is doubtless in Italy, near Florence, and I do not believe any duplicates of this general collection exist elsewhere. . . . The collection is in private hands, of a grandson of Bertolini, I believe. All the Bertolini species described from Guatemala were based on collections made by one Velasquez . . . in the general region of Escuintla . . . almost certainly along the old road between Escuintla and Volcán de Agua."

22 RANUNCULUS ORTHORHYNCHUS Hook.

Hirsute to glabrous subpalustrine or terrestrial perennials; roots 1-2 mm. in diameter; stems reclining below or suberect, not rooting, 1.5-12 dm. long, 1.5-6 or 9 mm. in diameter, branching, fistulous, hirsute to glabrous, the hairs ascending or spreading, and tending to be appressed, basal leaf blades pinnate with 3-7 leaflets, ovate or cordate-ovate in outline, 4-8 or 13 cm. long, 3-6 or 10 cm. broad, the leaflets alternate or opposite, again twice-forked or -lobed, the divisions linear to cuneate or orbicular, ultimate lobes acute or obtuse, appressed-pubescent to glabrous; petioles 3-15 or 20 cm. long, appressed-hispidulous to glabrous, the stipular leaf bases 1-6 cm. long; cauline leaves

alternate, similar to the basal, the bracts deeply parted to simple, petioled or sessile; pedicels 1.5-8 cm. long in flower, up to 15 cm. long in fruit, appressed-pubescent to glabrous; sepals 5, greenish-yellow, reflexed for about two-thirds their lengths, ovate-acute, 6-10 mm. long, 2-4 mm. broad, pilose, hirsute, or glabrous dorsally, usually one- to two-thirds the length of the petals, deciduous before the corolla; petals 5, yellow or (in the Pacific Northwest) often red dorsally in var. *typicus*, 8 or 10-19 mm. long, 4-7 mm. broad, truncate or emarginate, the nectary scale glabrous, free almost its whole length, nearly as broad as the adjacent part of the petal or broader than the petal, truncate; stamens 20-40; achenes 4 or 10-30 or 35 in a capitate cluster or subglobose head 3-10 mm. long and 5-9 mm. in diameter, each achene elliptic or obovate, 3-4 mm. long, 2.3-3 mm. dorsoventrally, 0.5-0.8 mm. laterally, smooth, glabrous, the margin prominently bevelled and slightly keeled, the beak slender, about 2.5-4 mm. long, straight; receptacle cylindroid, 1-3 mm. long in flower, 2-9 mm. long in fruit, hispidulous with at least a few tufts of hairs.

22a RANUNCULUS ORTHORHYNCHUS var. **typicus,** nom. nov.*

Ranunculus orthorhynchus Hook. Fl. Bor. Amer. 1: 21. *pl. 9.* 1829. *R. ornithorhynchus* Walp. Rep. 1: 43. 1842, error in spelling. *R. orthorhynchus* "form" *stenophyllus* A. Gray, Proc. Amer. Acad. 21: 377. 1886.

Meadowland at low elevations along the Northwest Coast in the Pacific Forest and at 4,500 to 6,500 feet elevation in the Sierran Montane Forest. Pacific Slope from British Columbia to Western Oregon and to Goose Lake, the middle North Coast Ranges, and the central Sierra Nevada, California. May and June.

Cf. note concerning a plant from Medford, Oregon, *J. W. Thompson 2122*, under *R. occidentalis* var. *Howellii*, page 51.

Where *Ranunculus orthorhynchus* crosses the range of var. *platyphllus* in southwestern Oregon and adjacent California, intergrades are abundant. The Sierra Nevada plants are also intermediate, and their assignment to var. *typicus* is rather arbitrary. They tend also toward var. *Hallii*.

Significant specimens.—BRITISH COLUMBIA: Port John, King Island, *Laing 521* in 1939, *Can* (apparently this variety); Burrard Inlet, *Macoun* in 1889, *Geol. Surv. Can. 1149, Can;* Somas Falls, New Westminster Dist., *J. R. Anderson* in 1904, *WSC;* common on Vancouver Island.

CALIFORNIA: DEL NORTE CO. Gasquet, *L. M. Brown 57* in 1934, *WSC*.

Type collections.—(1) *R. orthorhynchus*, "Not unfrequent on the low points of land near rivers, in North-West America. Douglas." Isotype (?): "Oregon, from Herb. John A. Lowell," *GH*. (2) "Form" *stenophyllus*, "The typical form of *R. orthorhynchus*, STENOPHYLLUS, has all the leaves somewhat bipinnately dissected into segments a line or less in width, or some radical ones simply divided into cuneate or obovate 2-3-lobed or toothed segments or leaflets." The type must be identical with that of *R. orthorhynchus*. Gray cited no specimens or localities for the "form."

* Cf. Table 8.

22b RANUNCULUS ORTHORHYNCHUS var. HALLII Jepson,*
Fl. Calif. 1: 542. 1922

Mountain meadows at about 6,000 to 7,000 feet elevation in the Sierran Montane Forest. Sierra Nevada from Yosemite National Park to Tulare County, California. June and July.

TABLE 8.—*Ranunculus orthorhynchus* Hook.

Var. *typicus*	Var. *Hallii*	Var. *alaschensis*	Var. *platyphyllus*	Var. *Bloomeri*
Stems 1.5-5 dm. long, 1.5-3 or 4 mm. in diameter, fistulous, hirsute, the hairs ascending and tending to be appressed.	Stems similar to those of var. *typicus*, the hairs spreading.	Stems 6-7 dm. long, 2-4 mm. in diameter, markedly fistulous, glabrous.	Stems 6-12 dm long, often 7-9 mm. in diameter, fistulous, hirsute, sometimes rathe densely so, the hairs spreading.	Stems 2-5 dm. long, 2-4 or 6 mm. in diameter, fistulous, glabrous or sparingly hispic.
Basal leaf blades pinnate, with 3-7 leaflets, these alternate or opposite, again twice-forked or -lobed, the divisions all (typically) linear or cuneate, acute, appressed-pubescent or glabrous, the petioles 3-12 cm. long.	Basal leaf blades similar to those of var. *typicus*, but the divisions often as broad as long, shallowly and obtusely lobed.	Basal leaf blades with 3 or 5 leaflets, the terminal leaflets 3-lobed and the lobes again notched, the lateral leaflets opposite or nearly so, cuneate to obdeltoid, 15-30 mm. long, of 13-30 mm. maximum breadth, the ultimate lobes rounded and the sinuses acute, the petioles 15-20 cm. long.	Basal leaf blades pinnate with 5-7 leaflets; similar to those of var. *typicus* but of maximum size for the species.	Basal leaf blades usually with 3 leaflets or a few of them simple, cordate-ovate in outline, 5-9 cm. long, 5-8.5 cm. broad, the leaflets orbicular to ovate, crenately shallowly lobed, markedly thick and shiny, glabrous or practically so, the petioles 5-15 cm. long.
Sepals pilose dorsally.	Sepals pilose dorsally.	Sepals glabrous, tinged with purple or magenta.	Sepals pilose-hirsute dorsally.	Sepals glabrous.
Sepals 5, yellow or (in Oregon and Washington) often red dorsally, 8- or 10-19 mm. long, 4-7 mm. broad, truncate.	Petals 5, yellow, 8-12 mm. long, 3-6 mm. broad, truncate.	Petals 5, yellow, about 11-12 mm. long, about 6 mm. broad, truncate.	Petals 5, yellow, 10-15 mm. long, 5-10 mm. broad, truncate.	Petals 5-8, yellow, 10-17 mm. broad, usually shallowly emarginate.

* Cf. Table 8.

TABLE 8.—(*Continued.*)

Var. *typicus*	Var. *Hallii*	Var. *alaschensis*	Var. *platyphyllus*	Var. *Bloomeri*
Achenes 12-20, elliptic, about 3 mm. long and 2.3 mm. dorsoventrally, the margins bevelled and slightly keeled, the beaks slender, about 4 mm. long.	Achenes 4-17, usually few, similar to var. *typicus* but the marginal keels carried more distinctly into the beaks.	Achenes 10-20, the bodies about 4 mm. long and 3 mm. dorsoventrally, the margins not markedly bevelled or keeled, the beaks about 3 mm. long.	Achenes 20-35, the heads larger than in var. *typicus*, the beaks less rigid and 2.5-3 mm. long.	Achenes 10 or 15-30 in a subglobose head 8-10 mm. long and 7-9 mm. in diameter, obovate, about 3.5 mm. long and 2.4 mm. dorsoventrally, the margins strongly bevelled, the beaks slender, 2.2-2.8 mm. long.
Receptacle 2-3 mm. long in fruit, hispidulous.	Receptacle as in var. *typicus* or smaller.	Receptacle as in var. *typicus*.	Receptacle enlarged and 5-9 mm. in diameter in fruit, hispidulous.	Receptacle about 4 mm. long in fruit, bearing a few tufts of hairs.
British Columbia to the middle North Coast Ranges and the central Sierra Nevada, California.	California in the Sierra Nevada from Yosemite National Park to Tulare County.	Extreme southeastern Alaska and adjacent British Columbia.	Possibly coastal Alaska; southeastern British Columbia to eastern Oregon, northern Nevada, Utah, western Montana, and northwestern Wyoming; western Northern California.	Lake County, Oregon; California from Mendocino and Lake counties to Santa Clara County.

Significant specimens.—CALIFORNIA: TUOLUMNE CO. Pine Crest, *C. Dudley* in 1940, *CAS, Wiggins 6798, GH* (intergrade to var. *typicus*); Confidence, *Jepson 7705, J, A. L. Grant 757* (duplicated number), *J;* Trail to Belle Meadow, *Jepson 6486, J;* Aspen Valley, Yosemite National Park, *Eastwood 174, CAS, L. Benson 3752, Pom-B, RM, DS, UC;* Twain Harte Post Office, 4,000 feet, *Alexander & Kellogg 3656, Pom-B;* Mather, *Munz 7403 Pom, Mason 588, Pom-B, UC, Heusi (Heisey) 1* in 1928, *CAS, DS, Pom-B; Hall & Babcock 3329, UC, GH, Hall 8903, UC, Keck 1165, Pom, CAS, DS, Quick 1471, CAS;* Iceland (Leland?) Meadow, Stanislaus National Forest, *Quick 1305, CAS* (intergrade to var. *typicus*). MARIPOSA CO. Yosemite Valley, *Congdon* in 1888, *UC, GH, Bioletti* in 1900, *UC* (Yosemite Valley or Hetch Hetchy Meadow), *Abrams 4565* (intergrade to var. *typicus*), *DS.* FRESNO CO. Shaver Lake, *K. Brandegee, UC, Vestal* in 1938, *Pom-B, Windblad* in 1940, *Pom-B, CAS;* Pine Ridge near Ockenden, *Hall & Chandler 141, UC, DS, 236, UC, DS* (type and isotype, cf. below). TULARE CO. Mineral King Road *Winblad* in 1941, *CAS, Pom-B.*

Type collection.—Near Ockenden (fide type specimen), "Pine Ridge, Fresno Co., Hall and Chandler 236 (type)." Type, *UC 9485;* isotype, *DS 142473.*

22c RANUNCULUS ORTHORHYNCHUS var. ALASCHENSIS L. Benson,* Bull. Torrey Club. 68: 483. 1941

(Liberal policy: specific rank)

R. orthorhynchus subsp. *alaschensis* Huit., Fl. Alaska & Yukon, Lunds Univ. Arssk. II. 40(1): 763. 1944. *R. alaskanus* Standl. ex Hult. *loc. cit.*, nom. nud., as syn.

Moist ground at low elevations in the Pacific Forest. Extreme south coast of Alaska and northwestern British Columbia. July.

Specimens examined—ALASKA: Sitka, *Whited 1389½, Mo;* Howkan, *Evans 127* in 1897, *US;* Tatoosh Islands, *Flett 1957, US,* Loring, *Chamberlain 24* in 1903, *US, 26* in 1903, *US;* Back Bay, *Leiberg 61, US;* Yes Bay, *Howell 1603, NY, HGr, UC, US* (type and isotypes, cf. below), *Gorman 61, NY, US;* Mainland at Anan Creek, *Mr. & Mrs. E. P. Walker 761, NY, GH, DS, UC, RM, US;* Craig, *J. P. Anderson 3012, ISC, Looff & Looff 781, Pom-B;* Ketchikan, *J. P. Anderson 501, ISC, Pom-B.*

BRITISH COLUMBIA: Klekane Inlet, 20 miles north of Swanson Bay, Graham Reach, [Graham Island, Queen Charlotte Islands ?], *McCabe 3588, Wash.*

Type collections.—(1) Var. *alaschensis*, "Shores of Yes Bay, Alaska, July 20, 1895, *Thos. Howell, Howell's Pacific Coast Plants No. 1603.* Type in the New York Botanical Garden." Type, *NY;* isotypes: *HGr, UC 118358, US 268795,* photograph *Pom-B.* (2) *R. alaskanus.* In 1946 the writer has seen for the first time the isotype of var. *alaschensis* at the United States National Herbarium. Standley had marked it as the type of his unpublished *R. alaskanus.* For *R. alaskanus,* the other collections cited above are isotypes. Hultén, *loc. cit.*, who cited the epithet as a synonym, preferred *alaskanus* to *alaschensis,* and he remarks, "This spelling alaskanus is preferable as Alaska was called 'Alascha' by only a few old authors." The spelling of the epithet according to the outmoded form was intentional in order to avoid the use of the letter "k," which was not used in classical Latin. The writer is not necessarily committed to this policy, since "k" and "w" are used frequently in botanical Latin, and they receive the blessing of the International Rules of Botanical Nomenclature (1935) in the example begun in the last line of the text on page 22 and concluded in the first line of page 23, in Recommendation XXXIX (c), and elsewhere. Recommendation XXXIX (c) is for retention of these letters once they are established but it does not include necessarily the suggestion of using them in new names or epithets, though this would follow from various examples such as those on pages 22 and 23.

22d RANUNCULUS ORTHORHYNCHUS var. PLATYPHYLLUS A. Gray,* Proc. Amer. Acad. 21: 377. 1886

(Moderate policy: *R. maximus* Greene)

R. maximus Greene, Bull. Torrey Club 14: 118. 1887. *R. orthorhynchus* var. *maximus* Jepson Fl. W. Mid. Calif. 200. 1901. *R. politus* Greene, *Pittonia* 5: 196. 1903. *R. platyphyllus* A. Nels. Bot. Gaz. 42: 52. 1906. *R. platyphyllus* Piper, Contr. U. S. Nat. Herb. 11: 276. 1906.

Meadows from sea level in the Pacific Forest up 7,000 feet elevation in the Sierran and Rocky Mountain Montane forests. Possibly in coastal Alaska; California along the coast from Del Norte County to Marin County and Berkeley, and in the upper Sacramento Valley and at Stockton (Pacific Grassland) mountains of the Great Basin from the southern edge of British Columbia to Eastern Oregon, northern Nevada, Utah, Montana, and northwestern Wyoming. Occurring abundantly in the Palouse Prairie. June and July.

Perhaps originally introduced into north coastal California by the Klamath

* Cf. Table 8.

River, which intersects the range of *Ranunculus orthorhynchus* and by the Pit River. Where the ranges of this and var. *typicus* overlap, hybridization appears to be frequent, and segregation is difficult.

R. orthorhynchus is reported from Sonoma County, California, by Ewan, Bull. Torrey Club 69: 144. 1942. Probably this is var. *platyphyllus*, but the specimen has not been seen.

Significant specimens.—ALASKA: (Unfortunately, all the following are of doubtful identity, and they may be var. *alaschensis*. Most are fragmentary, and all are inadequate.) Dolomi, *Beach* in 1913, *CAS, Wash;* Wingham Island, *McMillin* in 1927, *DS;* Dall Island, *Swarth* in 1908, *UC;* Gravina Island, *J. P. Anderson 5382, ISC.*

BRITISH COLUMBIA: Queen Charlotte, *Anderson* in 1909, *NR* (may have been var. *alaschensis*); Trail, *Macoun* in 1902, *Geol. Surv. Can. 63485, Can, HGr, NY, GH;* Nelson, Kootenai Dist., *J. R. Anderson 531, WSC.*

WASHINGTON: CHELAN CO. Cascade to Berne, *Otis 961, CAS.* KITTITAS CO. (?) Table Mountain, *J. W. Thompson 9738, Pom-B, DS, GH, Wash, UC, 14903, Pom-B, CAS, DS, Wash, GH, McGee 1031, CAS, Hitchcock, Rethke, & Radshooven* 3632, *DS, Wash;* Mt. Rainier Forest Reserve (perhaps Pierce County), *Flett* in 1899, *US.* YAKIMA CO. Yakima Region, *Brandegee* in 1882, *NR, Mo (14129* on sheet); Bull Canyon, Yakima Indian Reservation, *Heidenreich 101* in 1932, *Wash.* KLICKITAT CO. *Suksdorf* in 1878, *GH;* Bickleton, *Gotfredson* in 1928, *Pom, M. E. Jones 25295* in 1930, *Pom, DS, Mo, 28898* in 1931 *Pom.* Eastern edge of Washington, numerous collectors.

CALIFORNIA: Common along the coast from Del Norte County to Marin County and Berkeley and east of the Cascade Mountains; rare in occurrence in the Sacramento Valley and in the lower San Joaquin Valley, as follows: SHASTA CO. Anderson, *L. E. Smith 329, CAS.* TEHEMA CO. Red Bluff, *Wickes* in 1917, *CAS.* SAN JOAQUIN CO. Stockton, *Rock* in 1917, *CAS.*

NEVADA: WASHOE CO. Pyramid Lake Region, *Lemmon* in 1879, *GH.* HUMBOLDT CO. Indian (Hinkey Summit), *Train 285, Pom-B, USNA, Maguire & Holmgren 22497, Utah;* Paradise Valley, *Kennedy 1049, RM;* Martin Creek, Santa Rosa Mountains, *Munz 16124, Pom, Wash.* ELKO CO. Gold Creek, *Nelson & Macbride 2148, NY, Utah, RM, GH, Mo;* Bear Creek Meadows, Jarbridge Mountains, *Maguire & Holmgren 22497, Utah,* California Creek, *Crane* in 1934, *Utah;* Cobb Creek 17 miles south of Mountain City, *Nichols & Lund 365, Clo;* Lamoille Creek, Ruby Mountains, *Rollins & Chambers 2549, DS, UC, GH, US.*

MONTANA: YELLOWSTONE NATIONAL PARK. *Treakle 147, Pom.*

WYOMING: West DeLacy Creek, *A. & E. Nelson 6315, HGr. DS, RM, Pom, Ill, GH.* YELLOWSTONE NATIONAL PARK. Compton in 1883, *NY;* West Thumb, *W. W. Jones* in 1900, *GH;* Yellowstone Lake, *A. & E. Nelson 6659, RM;* Yellowstone Falls, *Blankinship* in 1899, *Pom.* TETON CO. Trail Creek, Teton Pass, *L. Williams 792, GH, CAS, RM, NY.* SHERIDAN CO. Tongue River, Bighorn Mountains, *Jack* in 1900, *GH.*

Type collections.—(1) Var. *platyphyllus*, "*R. macranthus*, Watson, Bot. King Exped. and Bot. Calif., not Scheele. — In wet places, Wahsatch Mountains and Idaho to E. Oregon, and California, south to Marin Co." The following is quoted from Watson in King, Rept. U. S. Geol. Expl. 40th Par. 5: 9. 1871, "RANUNCULUS MACRANTHUS, Scheele. . . . Texas, California (4,729 Bolander), and Oregon, (Lyall.) Streambanks in the Wahsatch and Uintas; 5-8,000 feet altitude; June to July. (28)." The specimen in the Gray Herbarium from the Wasatch Mountains, *S. Watson 28*, collected in 1869, has been designated a lectotype, cf. L. Benson, Bull. Torrey Club 68: 483. 1941. Lectotype, *GH, photographs DS* and *Pom-B;* isotype, *NY.* (2) *R. maximus.* "*R. macranthus*, Brew. & Wats., Bot. Cal. i. 8, not of Scheele; R. orthorhynchus, var. platyphyllus, Gray, Proc. Am. Acad. xxi. 377, as to Californian plant at least." Brewer and Watson refer the reader to "Watson, Bot. King 9," and they state further "Moist soils from Oregon to Nevada and Texas. In this state [California] near the coast." The reference to *R. orthorhynchus* var. *platyphyllus* includes specifically

only the "California plant." Since both var. *platyphyllus* and *R. macranthus* of the Botany of California were based upon Watson's previous publication (Rept. U. S. Geol. Expl. 40th. Par. 5: 9. 1871, as cited above), the single California specimen mentioned has been designated a lectotype, cf. L. Benson, Bull. Torrey Club 68: 483. 1941. It is *Bolander 4729* from Long Valley, Mendocino County. Lectotype, *GH*, photographs *DS* and *Pom-B;* isotypes, *US 320365, UC 9387. UC 9386,* under the field number *4729,* is var. *Bloomeri.* (3) *R. politus,* "A subalpine plant of the mountains of eastern Oregon, by W. C. Cusick (n. 2382 of my set), wrongly named *R. maximus,* Greene. Type, *HGr 2690;* isotypes, *NY, GH,* photograph *Pom-B, US 385297, UC 9551, RM 31488,* photograph *Pom-B, Mo* (not numbered), *Pom 99207.*

22e **Ranunculus orthorhynchus** var. **Bloomeri** L. Benson, comb. nov.*
(Moderate policy: *R. Bloomeri* S. Wats.)

R. Bloomeri S. Wats. Bot. Calif. 2: 426. 1880.

Very wet and heavy adobe soil of meadows, sloughs, and ditches in the California Oak Woodland. Lake County, Oregon; California from Mendocino and Lake counties to Santa Clara County.

The status of *Ranunculus Bloomeri* as a species has been weakened markedly by the following collections and by studies in the field, particularly in Lake County, California.

OREGON: LAKE CO. Forest Camp, Dairy Creek, 35 miles northwest of Lakeview, *Peck 15418, DS, WillU, Wash, Mo 949957;* Head of Deep Creek, eastern base of the Warner Mountains, *Applegate 7458, DS* (this collection approaching in some ways var. *Hallii*).

CALIFORNIA: MENDOCINO CO. Rowe's Station, *Chandler 1054, UC.* LAKE CO. Big Valley near Lakeport, *Hitchborn* in 1930, *DS;* 5 miles west of Kelseyville, *L. Benson 598, Pom-B,* Kelseyville, *L. Benson 6311, Pom-B, 6603, Pom-B;* Cold Creek near Kelseyville, *Blankinship* in 1929, *Mo;* 3 miles southeast of Kelseyville, *Peirson* in 1926, *Peirson 6594;* Upper Kelsey Creek, *Blankinship* in 1923, *CAS;* Cobb Valley, *L. Benson 6628, Pom-B;* Jordan Park, Cobb Valley, *Jussel,* Mar. 30, 1931, *Pom, CAS,* April 1, 1931, *CAS.* SONOMA CO. Valley Ford, *Sobenstein* in 1906, *UC;* Knight's Valley, *Wiggins 5757, DS, Pom-B, Pom, 5758, DS, Pom.* SOLANO CO. Suisun, *Setchell* in 1897, *UC* (tending only slightly toward var. *platyphyllus*).

Significant specimens.—CALIFORNIA: MENDOCINO CO. Elk (Mendocino City), *Eastwood & Howell 4442, CAS;* Ukiah, *Bradford* in 1927, *CAS;* Talmadge, *Abrams 6968, DS;* Hopland, *Blankinship* in 1920, *Carnegie Library, Lakeport, California;* Mountain House (McDonald) at junction of Navarro River road with old U. S. 101 between Hopland and Cloverdale, *L. Benson 3, Pom-B.*

Type collections.—"In wet grounds near San Francisco, *Dr. J. G. Bloomer.* The specimens are imperfect and not yet in fruit, but indicate a very distinct species." Type, *GH,* photograph *Pom-B.*

23 RANUNCULUS FASCICULARIS Muhl.

Appressed-pubescent terrestrial perennials; roots of the main fascicle of two types, some filiform (about 0.5 mm. in diameter) and some (storage roots) 1-2 mm. or up to 5 mm. in diameter and markedly tuberous, fusiform; stems erect or suberect, often scapose, not rooting, 1-3 dm. long, rarely more than 1.5 mm. in diameter, 1-4-flowered, not fistulous; basal leaf blades compound or at least the early ones 3-parted, ovate-oblong in outline, 2.5-5.5 cm. long, 2-4 cm. broad, distinctly longer than broad, leaflets 3 or commonly 5, sometimes the leaf partly bipinnate, the leaflets or divisions simple and

* Cf. Table 8.

rounded to deeply 3-7-parted and again angularly toothed, the ultimate parts blunt or rounded at the apices, the petioles averaging 1 dm. long; stipular leaf bases 1.5-3.5 cm. long; cauline leaves usually 1 or 2, alternate, much reduced; pedicels 1.5-6 cm. long in flower, 2.5-9 cm. long in fruit; sepals 5, greenish-yellow, spreading (except in one specimen), ovate-attenuate, 6-8 mm. long, 2-3 mm. broad, usually silvery-pubescent, half the length of the petals, promptly deciduous; petals 5, or sometimes up to 9, yellow, obovate-oblanceolate, 7-15 mm. long, 3-6 mm. broad, the nectary scale glabrous, free almost its whole length, truncate; stamens usually about 40 or 50; achenes 10-30 in a subglobose head 4.5 mm. long and 6-10 mm. in diameter, each achene obovate-orbicular but with a short, flat stalk, the main body 1.5-2.5 or 3 mm. long, 1.5-2 or 2.5 mm. dorsoventrally, 0.6-1 mm. laterally, smooth, glabrous, the margin keeled but usually not prominent, the beak slender, 2-2.3 mm. long, straight; receptacle fusiform or obovoid, 1.5-2.5 mm. long in flower, 3-7 mm. long in fruit, sparsely hispidulous.

23a RANUNCULUS FASCICULARIS var. **typicus,** nom. nov.

R. fascicularis Muhl. ex Bigel. Fl. Bost. ed. 1. 137. 1814. *R. fascicularis* var. *Deforestii* Davis, Minn. Bot. Studies 2: 470. 1900.

Stems 1-2 dm. long; basal leaf blades compound or the early ones 3-parted, ovate-oblong in outline, 2.5-5.5 cm. long, 2-4 cm. broad, distinctly longer than broad, leaflets 3 or commonly 5, sometimes the leaf partly bipinnate, the leaflets deeply 3-7-parted and again angularly toothed, the ultimate parts blunt at the apices; petals 5 or rarely 9 (some flowers of 1 specimen), 7-15 mm. long; each achene obovate-orbicular with a short, flat stalk, the main body 1.5-2.5 mm. long, 1.5-2 mm. dorsoventrally, 0.6-1 mm. laterally, the margin keeled but the keel not prominent.

Rather dry situations at low elevations in the Deciduous Forest. Cumberland House, Canada; Minnesota to Ontario, New England (except Maine and Rhode Island), New Jersey, and Maryland and southward to Oklahoma, Mississippi, and Tennessee; Chester, South Carolina; "Southern Flora" (*Chapman, NY*, sepals reflexed). March to May, depending upon latitude; commonly called "early buttercup."

Truly tuberous roots are rare in specimens from east of the Mississippi Valley.

Significant specimens.—CANADA: Cumberland House, *Richardson, Can.*
ONTARIO: Ox Point near Belleville, *Macoun* in 1877, *GH, Can;* Strathroy, *Greene* in 1909, *HGr;* Rockport, *Sheldon* in 1882, *PA;* Sandwich, *Macoun* in 1901, *Geol. Surv. Can. 33580, Can;* Galt, *Herriott* in 1902, *Geol. Surv. Can. 63043, Can;* Walpole, *Dodge* in 1895, *Can.*
MINNESOTA: *Campbell, Mo.* STEARNS CO. St. Cloud, *Campbell, PA.* CHISAGO CO. Taylor Falls, *Butters* in 1920, *NY.* GOODHUE CO. Red Wing, *Sandberg* in 1886, *PA.*
KANSAS: CHEROKEE CO. *Hitchcock 1104, GH* (not *NY, RM, US,* or *Mo*).
MISSISSIPPI: PANOLA CO. Long Creek, *E. J. Hill* in 1857, *Ill.*
MARYLAND: GARRETT CO. Oakland, *Greene* in 1898, *HGr.*
SOUTH CAROLINA: CHESTER CO. Chester, *Muenscher 16181, GH.*

Type collections.—(1) *R. fascicularis,* "The plants described in this book have been collected during the last two years in the vicinity of Boston, within a circuit of from 5

to 10 miles." 1812-13. (2) Var. *Deforestii*, "Collected by Henry P. DeForest (G. 42) near Rossville, Ill., April 12, 1885." Type, *Crn*, photograph *Pom-B*. (Some flowers have 9 petals and some have 5).

23b RANUNCULUS FASCICULARIS var. APRICUS (Greene) Fern. Rhodora 38: 178. 1936

R. apricus Greene, Pittonia 4: 145. 1900. *R. illinoensis* Greene, Pittonia 5: 195. 1903.

Stems 1-3 dm. long; leaflets or leaf segments oblanceolate to narrowly elliptic, shallowly few-toothed apically or entire; petals 5, like those in the var. *typicus;* achenes like those of var. *typicus*.

Mostly in the Prairie. "S. W. [S. E.?]Colorado"; Cherokee County, Kansas, to Alto Pass, southern Illinois, and southwward to eastern Texas, Louisiana, Mississippi, and Alabama. March and April.

The form occurring in wet ground in Louisiana and at Galveston, Texas, is 2-3 dm. tall and is with usually small fruit and with less hair on the plant.

Significant specimens.—COLORADO: "S. W. [S. E. ?] Colorado," *Flint, NY*.

KANSAS: CHEROKEE CO. *A. S. Hitchcock 1104, NY, RM, US, Mo* (not *GH*).

ILLINOIS: Alto Pass, *C. F. Baker* in 1900, *HGr*, photograph *Pom-B*, *Pom* (type and isotype of *R. illinoensis*, cf. below).

KENTUCKY: UNION CO. Chalybeate Springs, *Shacklette 70* in 1940, *CAS, Mo, Clo, PA, GH* (near var. *typicus*), (not *Mo*, which is var. *typicus*). WARREN CO. Bowling Green, *S. F. Price* in 1900, *Mo*.

MISSISSIPPI: CARROLL CO. North Carrollton, *Clute 16* in 1899, *NY*. HINDS CO. Jackson, *Canby* in 1900, *GH*. ADAMS CO. Natchez, *Gale* in 1840, *NY*. MADISON CO. Natchez Trace Parkway, *W. B. McDougall 1226, US*.

ALABAMA: GREENE CO. West Greene, *Harper 3155, GH, Mo, PA*.

Type collections.—(1) *R. apricus*, "Near Sapulpa, Indian Territory [Oklahoma], 29 April, 1895, *B. F. Bush*." Type, *Bush 965, HGr 2493*, photograph *Pom-B;* isotypes, *NY*, photograph *Pom-B, Mo*. (2) *R. illinoensis*, "Collected at Alto Pass, in southern Illinois, 21 April, 1900, by Mr. Carl F. Baker, who reports that it occurs in large patches on moist open hillsides." Type, *HGr 2630*, photograph *Pom-B;* isotype, *Pom 150644*, but not *Pom 150643*, which is var. *typicus*. This is an extreme robust plant.

23c RANUNCULUS FASCICULARIS var. CUNEIFORMIS (Small) L. Benson Bull. Torrey Club 68: 490. 1941

R. cuneiformis Small, Bull. Torrey Club 27: 276. 1900.

Stems 18-25 cm. long; leaves like those of var. *typicus* but a little larger and coarser; petals 7-9, 13-15 mm. long when fully expanded; achene 3 mm. long, 2.5 mm. dorsoventrally, the margin 0.5 mm. broad, distinctly marked.

Moist ground, Bear Creek, Kerr County, Texas. Known from only the type collection. April.

This plant combines characters of var. *apricus* and *R. macranthus*, and it may be a hybrid between these plants and only sporadic.

Type collection.—"On prairies, near Kerrville, Texas. Spring. Heller, Pl. S. Tex. no. 1688." Type, *NY*, photograph *Pom-B;* isotypes, *GH*, photograph *Pom-B. Ill*, photograph *Pom-B, UC 9549, Mo* (not numbered), *PA*. (Another sheet at *PA* is *R. macranthus*).

24 RANUNCULUS MACRANTHUS Scheele

Strongly hirsute to subglabrous terrestrial perennials; roots usually numerous, stout, 2-4 mm. in diameter; stems reclining to suberect, not rooting, 3-6 (or reported up to 10) dm. long, 1-8 mm. in diameter, fistulous or in 1 variety scarcely so, densely hirsute; basal leaf blades compound and dissected or sometimes simple and merely lobed (cf. second paragraph below), oblong-ovate in outline, 4-23 cm. long, 3-25 cm. broad, usually of 3-5 or 7 leaflets, these proximally truncate or obtuse and distally acute or barely obtuse, appressed-hispidulous; petioles 0.5-3 dm. long, hirsute to subglabrous; pedicels 1.5-11 cm. long in flower, 5-30 cm. long in fruit, appressed-pubescent; sepals 5, yellowish-green, reflexed, ovate-attenuate, 6 or usually 8-10 mm. long, 3-5 mm. broad, appressed-pilose dorsally, half or two-thirds as long as the petals, promptly deciduous; petals 8-18, yellow, oblanceolate or rarely obovate, sometimes emarginate, 10-20 mm. long, 2.5-6 or rarely 10 mm. broad; achenes 35-130 in a subglobose or cylindroid head 7-14 mm. long and 7-10 mm. in diameter, each achene elliptic-oblong or obovate, about 2.5-4 mm. long, 2.3-2.6 mm. dorsoventrally, 1 mm. laterally, smooth, glabrous, the margin keeled, the beak slender, 3-5 mm. long, straight; receptacle cylindroid, 2-3 mm. long in flower, 5-12 mm. long in fruit, hairy but the hair often sparse.

This species is distinguished from its relative, *Ranunculus orthorhynchus* Hook. var. *platyphyllus* A. Gray, which occurs from Alaska to California and Utah, by the following characteristics: petals 8-18 (instead of 5); achenes about 35-130 (instead of 15-35), not strongly margined, the beaks not angled, very slender and apparently flexible; leaves generally more strongly veined (the extreme being reached in var. *Arsenei*); roots thicker and with a slight tendency to be tuberous, mostly 2.5-4 mm. in diameter.

Specimens of var. *typicus* obtained at Canelo, Santa Cruz County, Arizona, near the north end of the Huachuca Mountains (*L. Benson 11460, Pom-B*) were grown first at Tucson, Arizona, and later at Claremont, California. These plants produced early basal leaves which were simple and 3-lobed or -parted and similar to those found on scattering herbarium specimens from various parts of Mexico. *Ranunculus Pringlei* Briq. was based upon specimens with this leaf type. Later in each season, the same plants produced compound leaves dissected into narrow divisions, like those in the majority of herbarium specimens. Similar phenomena have been observed by the writer in cultivation of *R. occidentalis* and *R. californicus*.

Evidence from the herbarium specimens of many species of *Ranunculus* indicates that there is a considerable expansion and particularly elongation of the petals after the beginning of anthesis, and this appears to account for the presence of relatively short petals in the flowers of some herbarium specimens differing in petal length and makes necessary specification of measurements taken when the petals are fully expanded. From *Ranunculus macranthus* var. *typicus* (*L. Benson 11460, Pom-B*), the following data were obtained in 1945 by measuring each day the petals of a flower during the five days on which it opened and closed.

Petal length in millimeters.

	Petal 1	Petal 2	Petal 3
June 17	12	15	16
June 18	16	18	19
June 19	18	18	20
June 20	20	21	21
June 21	20	21	21

On the sixth day, which was cloudy, the petals were persistent for a time, but finally deciduous. It will be noted that full elongation was not attained until the fourth day.

24a RANUNCULUS MACRANTHUS var. **typicus**, nom. nov.

R. delphinifolius H. B. K. Nov. Gen. et Sp. 5: 39 (folio), 48 (quarto). 1821, not Torr. in 1818. *R. macranthus* Scheele, Linnaea 21: 585. 1848. *R. fasciculatus* Sessé & Moc. Fl. Mex. ed. 2. (in La Naturaleza, vol. 2, appendix). 134. 1894. *R. subalpinus* Davis, Minn. Bot. Studies 2: 474 1900. *R. Lindenianus* Briq. Ann. Conserv. & Jard. Bot. Genève 11 & 12: 180. 1908. *R. Pringlei* Briq. *loc. cit.* 181. *R. Townsendii* Briq. *loc. cit.* 182.

Robust or sometimes (southward) rather slender, the stems 1-2 or commonly 3-6 mm. in diameter; strongly hirsute or rarely (southward) subglabrous; larger leaves 4-10 or 15 cm. long, 4-10 cm. broad, dissected or merely lobed and toothed, the veins noticeable but not conspicuous or raised on the lower surface of the leaf.

United States in the Rocky Mountain Forests (?) and the Southwestern Oak Woodland in the mountainous parts of Eastern Arizona and western and southern Texas; Mexico from Sonora and Chihuahua to Michoacán, western Vera Cruz, and Oaxaca. Some southern forms are more slender and with narrower leaf-divisions (*R. delphinifolius* H. B. K.).

Significant specimens.—NEW MEXICO (?): *Wright 838* in 1851, *NY, GH*, in 1852, *PA*.

MEXICO. STATE UNKNOWN: *Sessé, Mociño, Castillo, & Moldonado* in 1787, 1795, or 1804 (type collection of *R. fasciculatus*, cf. below), *F*.

SONORA: Santa Cruz River, *Schott, NY, US;* Rio de los Alisos, *Wiggins 6994, DS, US*.

CHIHUAHUA: Debie in 1934, *Mich, Tex;* La Junta, *Pennell 18746, US, PA;* Madera, *Palmer 299* in 1908, *GH, US, F, Mo, NY;* Colonia Garcia, *Townsend & Barber 36, GH, US, NY* (isotypes of *R. Townsendii*, cf. below), *Pennell 19111, US, PA, Pom-B, 19148, US;* Guachochic, *Hartman 510, GH;* Sierra Madre, *E. W. Nelson 6069, US, GH* (the extreme of the simple, 3-lobed leaf type); Round Valley, *M. E. Jones* in 1903, *Pom, UC;* Mound Valley, *M. E. Jones* in 1903, *Pom-B, US;* San Juanito, Dist. of Boycona, *Shreve 8030, UA-Shr, F, US, Knobloch 5433*, F; Chuhuichupa, *LeSueur 633, F;* Majalca, *LeSueur 625, GH, UA-Shr*, F; *Chihuahua, LeSueur 629, F, UA-Shr*.

DURANGO: Durango, *Palmer 610* in 1896, *GH, F, Mich, Pom-B, Mo, UC, US, NY;* Otinapa, *Palmer 390* in 1906, *US, NY, F, GH, UC, Mo;* El Salto (Aserraderos), *Pennell 18304, PA*.

JALISCO: Rio Blanco, *Palmer 24* in 1886, *GH, Pom-B, NY, Mo, US*.

SAN LUIS POTOSI: San Miguelito, *Schaffner 184, GH;* Las Canoas, *Pringle 3065* (isotypes of *R. Pringlei*, cf. below), *US, PA, UC, NY, GH, F, Mo, Mich*.

GUANAJUATO: Guanajuato, *Dufis* (?) in 1880, *GH*.

HIDALGO: Between Pachuca and Real del Monte, *Rose, Painter, & Rose 8669, US;* Sierra de Pachuca, *Rose & Hay 5626, US;* Pachuca, *Purpus 1423, Mo, UC, NY;* between Somoriel and Las Lajas, *Rose, Painter, & Rose 9177, F, GH, NY, US;* Cuidad Real (perhaps Real del Monte), *Linden* in 1840 (type of *R. Lindenianus*, cf. below), photograph *F;* El Chico, *Lyonnet 527, US, Mo, GH;* Jacala, *V. H. Chase 7361, GH, F.*

MICHOACÁN: Lake Patzcuaro, *Langman & Martin 2256, PA;* Zinapecuaro, *Gregg 762, Mo.*

MEXICO: Santa Fe, *Borgeau* in 1865-6, *US, GH;* 93 km. east of Mexico City, *Mexia 2649, Mo, UC, Mich, CAS, US;* Guadalupe, *Rose, Painter, & Rose 8518, US;* Tultenango, *Rose & Hay 5411, US;* Flor Maria, *Rose & Hay 5458, US, GH;* Hacienda de la Encarnacion, *Rose, Painter, & Rose 8431, US;* Mina del Agua, Temascaltepec, *Hinton 7976, NY, US,* Cajones, Temascaltepec, *Hinton 4233, US.*

TLAXCALA: Mt. Malinche, *Balls 5653, UC.*

PUEBLA: Puebla Road, *Langman 2534, PA;* Puebla, *Arsène,* June 6, 1910, *NY US, 1115, US, 1360, US,* 1531, *US, Nicolas* in 1910, *NY, Pom-B, Nicolas 5164 and 5198 combined, GH, Mo, CAS, Ill, US;* Arcos, Ojo de Agua, Sierra Negra, *Balls 4765, UC;* Ojo del Agua, *Halsted, NY;* Hacienda Batan near Totimehuacan, *Arsène 10166, US.*

VERA CRUZ: Orizaba, *Rowntree* in 1938, *UA-Shr;* Mt. Orizaba, *Rose & Hay 5695, US.*

GUERRERO: Taxco, *Langman 2092, PA.*

OAXACA: Oaxaca, *Rose & Hough 4600, US; Conzatti & Gonzales 12* in 1900, *Mo*

Type collections.—(1) *R. delphinifolius*, "Crescit locis humidis, prope Real del Monte, alt. 1430 hex (Regno Mexicano.)" (2) *R. macranthus*, "Prope Neubraunfels leg. Römer. Aprili." Texas. (3) *R. fasciculatus*, "Habitat in montibus frigidus N [ovae] H [ispaniae]. Floret Iulio." Cf. citation above under "state unknown" at the beginning of the list of specimens examined. This is a less hirsute slender type with finely divided leaves, which occurs here and there southward. Type collection, *F 846434*, photograph *Pom-B.* (4) *R. subalpinus*, nom. nov. for *R. delphinfolius.* (5) *R. Lindenianus*, "Mexicum: Ciudad Real [Real del Monte, Hidalgo. ?], mart. 1840 fl. (Linden sine no.)." Type, photograph F 750798, rephotograph *Pom-B.* (6) R. Pringlei, "Mexicum: Civitas San Luis Potosi, in declivibus graminosis Lacanoas [Las Canoas], 9 jul. 1890 fl. fr (Pringle n. 3065)." *US 1322* and *1323, PA, UC 118311* and *1419456, NY, GH*, photograph *Pom-B, F, Mo 212053* and *263593, Mich.* This is the type with merely lobed and toothed leaves. Specimens from Canelo, Arizona, now in cultivation (*L. Benson 11460*) produce this leaf type at the beginning of the growing season and dissected leaves later. (7) *R. Townsendii*, "Mexicum: Civitas Chihuahua, Sierra Madres propa Colonia Las Canoas [perhaps an error due to confusion with the type locality of *R. Pringlei;* Colonia Garcia on the label], 16 jun. 1899 fl. (Townsend & Barber n. 36)." Isotypes, *GH, US 347021* and *1315656*, photograph *Pom-B, Mo 212056, NY.*

24b **Ranunculus macranthus** var. **Arsenei** L. Benson, var. nov.

Exceedingly robust; strongly hirsute to subglabrous; both basal and cauline leaves large, 10-23 cm. long, 10-25 cm. broad, dissected, the divisions mostly 6-10 mm. broad, markedly veiny.

Robustissimus; hirsutis vel subglabris; foliis maximis, 10-23 cm. longis, 10-25 cm. latis, dissectis, divisionibus 6-10 mm. latis.

Meadows at 5,000 to 8,000 feet elevation. Sierra Madre Occidental and mountains at the southern edge of the Mexican Plateau from Zacatecas to Michoacán and southeastward to Puebla.

Specimens examined.—MEXICO. ZACATECAS: Plateado, *Rose 2803, US.*

NYARIT (TEPÍC): Between Dolores and Santa Gertrudis, *Rose 2037, NY, GH, US;* Tepíc, Palmer in 1892, *US.*

MICHOACÁN: Punguato near Morelia, *Arsène,* June 20, 1912, *Mo, Ill, 2725, US, NY, GH, F, Mo, Ill,* June 26, 1909, *GH, US, Pom-B* (2 sheets), *NY, F;* Rancho Aguacate, Morelia, *Arsène,* July 11, 1912 (type collection, cf. below), *US, NY, GH, Mo, Ill;* Morelia, *Kenoyer A477, F.*

MEXICO: Cajones, Dist. of Temascaltepec, *Hinton 979, US.*

PUEBLA: Vicinity of Puebla, Hacienda Alamos, *Arsène 1223, US.*

Type collection.—Rancho Aguacate, alt. 1950 m., Morelia, Michoacan, *Bro. C. Arsène* July 11, 1912. Type in the United States National Herbarium, *no. 1003832,* photograph *Pom-B;* isotype *Ill,* photograph *Pom-B.* The specimen is mounted with the upper sides of the leaves up. The extreme veininess may be seen best on the lower side, as for example by carefully lifting up the leaf at the lower left corner of the herbarium sheet (just above the pocket). Isotypes, *NY, GH, Ill, Mo 842570.* The Arsène collection (*1223, US 1003836*) from Puebla is excellent for leaf characters, but the plant is more hirsute.

25 RANUNCULUS DICHOTOMUS Moc. & Sessé ex DC. Syst. 1: 288. 1818

R. Llaveanus Schlect. Linnaea 10: 233. 1835. *R. pinnatus* Sessé & Moc. Fl. Mex. (in La Naturaleza, vol. 2, Appendix) ed. 2. 135. 1894. *R. dichotomus* var. *genuinus* Briq. Ann. Conserv. & Jard. Bot. Genève 11 & 12: 178. 1908.

Subglabrous or sometimes hirsute palustrine perennials; roots fibrous or slightly thickened, 1.5-3 mm. in diameter; stems sprawling or suberect, some of them stoloniferous, all tending to root at the nodes, 2-6 dm. long, 1-6 mm. in diameter, usually fistulous; basal leaf blades pinnate, ovate or ovate-lanceolate in outline, the leaflets about 3 times ternately divided or deeply parted, cuneate-obovate in outline, the divisions linear, often very narrowly so; petioles 7-30 cm. long, glabrous or sometimes hirsute; cauline leaves few on the flowering stems, well-developed on the stolons, the bracts ternate or simple; pedicels 2-7 cm. long in flower, 6-14 cm. long in fruit, appressed-pubescent or subglabrous; sepals 5, greenish-yellow, reflexed, lanceolate to ovate-lanceolate, 6 or 8-12 mm. long, 2-4 mm. broad, appressed-pilose, the tips saccate, half or two-thirds the length of the petals, promptly deciduous, petals commonly 5-6 but as many as 9, obovate or oblong, 10-15 mm. long, 4-9 mm. broad; stamens about 30-60; achenes 35 or 40-100 in an ovoid or subglobose head 7-13 mm. long and 7-11 mm. in diameter, each achene cuneate-obovate, 2.5-3 mm. long, 2-2.3 mm. dorsoventrally, 1 mm. laterally, smooth, glabrous, the margin well-marked, slightly keeled, the beak slender, somewhat flattened, 2-3 mm. long, straight, flexible; receptacle ovoid or subglobose, 2-3 mm. long in flower, 6-9 mm. long in fruit, pubescent or sparsely short-hispid.

Wet meadows and ditch and lake borders at 5,000 to 8,000 or rarely 12,000 (?) ft. elevation. Mexico from Jalisco to San Luis Potosí and western Vera Cruz and southward to western Guatemala.

Specimens examined.—MEXICO. STATE UNKNOWN: Photograph of drawing in the Delessert Herbarium, *Sessé & Mociño, F* (type collection of *R. dichotomus,* cf. below) *Sessé, Mociño, Castillo, & Moldonado* in 1787, 1795, or 1804, *F 845304* and *846445,* photograph *Pom-B* (type collection of *R. pinnatus,* cf. below), *F 846445, Woelfflin* in 1845, *NY; Halsted, NY.*

JALISCO: Ferreria, *M. E. Jones 707* in 1892, *Pom;* Guzman, *Nagel 8054, GH.*

SAN LUIS POTOSÍ: San Luis Potosí, *Parry & Palmer 5* in 1878, *GH, Mo, US.*

MICHOACÁN: Zitacuaro, *Hinton 11855, GH, 11888, GH, 11938, GH;* Morelia, *Arsène 3327, DS, Pom-B, US, GH, NY, Mo, F, Ill;* Lake Patzcuaro, *Pringle 3528, F, GH, 4153, US, GH, NY, F, UC, Mo, Pom-B, Mich, PA* (a hairy form with broad leaf divisions), *Heilprin & Baker 1890, PA, Schery* in 1941, *Mich, Langman 2255, PA, US;* Tlaupujahua, *Rose & Hay 5405, US.*

HIDALGO: Sierra de Pachuca, *Rose & Hough 4952, US, Rose & Hay 5625, GH, US* (in part), *Rose, Painter, & Rose 8874, NY, US;* Ixmiquilpan, *Rose, Painter, & Rose 9087, US;* Real del Monte, *Clokey 1846, Clo, Mo;* between Pachuca and Real del Monte, *Rose, Painter, & Rose 8689, F, Mo, US, GH, Goodman 3393, Pom-B;* Mixquiahuala, *H. E. Moore, Jr. 1375, Pom;* between Molango and Atexca, *H. E. Moore, Jr. 2986, Pom;* Tulancingo, *H. E. Moore, Jr. 2809, Pom;* Zerezo, *H. E. Moore, Jr. 3128, Pom;* Ixmiquilpan, *H. E. Moore, Jr. 3360, Pom;* Rio Teponapa near Zacualtipan, *H. E. Moore, Jr. 3199, Pom;* Mineral del Monte, *H. E. Moore, Jr. 1653, Pom.*

MEXICO: Cacubaya, *Borgeau 1* in 1865-6, *US, NY, GH;* Lake Xochimilcho, *Harshberger 80* in 1896, *US, GH, PA;* Valley of Mexico, *Pringle 7773, Mo, GH, RM;* Tlalpam, *Pringle 9504, NY, GH, US, Crn, Pringle 11913, US, Crn, UA-Shr, Mich, GH, F, Rose & Hay 5484, GH, US;* Chapultepec, Contreras, *Langman 2467, PA;* Barrancas de Mixcoac, *Lyonnet & Elcoro 1148, US;* Laguna Zimpoala, *Barkley, Webster, & Rowell 7418, Pom; Rose & Hough 4234, US; Popocatepetl,* 12,000 ft., *Kenoyer A476, F* (altitude perhaps open to question); Mesón Viejo, Dist. of Temascaltepec, *Hinton 6245, US;* Crucero, Dist. of Temascaltepec, *Hinton 8003, UA-Shr, Mo, F, NY, GH, US;* Hacienda de la Encarnacion, *Rose, Painter, & Rose 8432, US, NY.*

MORELOS: Lakes of Zempoalta, *Langman 2650, PA.*

PUEBLA: Puebla, *Arsène 310* in 1906, *US, 1319, US, Mo, 1439, US, 1473, US, 1476, US, 1524, GH, US, 2236, NY, US, Ill, Mo,* May 9, 1907, *US, 7106, US, 7151, Mo, US, 7170, US, 7206, US, Nicolas 5226, US.*

VERA CRUZ: *Schiede, Mo;* Cofre de Perote, *Balls 4583, US, UC;* Chiconguniaco, Sierra Madre, *Purpus 6010, UC, GH;* C. de Pente (?), *E. W. Nelson* in 1893, *US;* Jalapa, *Schiede* (isotype of *R. Llaveanus*, cf. below), *NY, GH, Mo,* photograph *F.*

OAXACA: Valley of Oaxaca, *Conzatti & Gonzalez 80* in 1896, Herb. unrecorded.

GUATEMALA. TOTONICAPÁN: San Cristobal, *Muenscher 12014, Crn, F.*

QUEZALTENANGO: Olintepeque, *Standley* in 1939, *Field Mus. Exped. 66024, F.*

CHIMALTENANGO: Near Chimaltenango, *Lehman 1504, US;* Chichavac, *Skutch 510, Mich* (2 sheets, 1 in part), *US.*

ZACATEPEQUEZ: Rio Guacalate, Standley in 1939, *Field Mus. Exped. 64708, F;* Dueñas, *Donnell Smith 2129, US, Pom-B, GH.*

Type collections.—(1) *R. dichotomus,* "Hab. in Mexico. (Moc. & Sess.)." Type collection, Delessert Herbarium, drawing *F 926903,* photograph *Pom-B.* (2) *R. Llaveanus* "In graminosis Jalapae. June 29." Vera Cruz. *C. Schiede.* Isotypes, *NY,* photograph *Pom-B, GH, Mo 212063,* photograph *Pom-B,* photograph *F 750800.* The plant is more hairy and with smaller flowers than usual. It is matched fairly well by specimens from Lake Patzcuaro, Michoacán, *Pringle 4153,* cited above. (3) *R. pinnatus,* "Habitat ad margines aquaductuum Mexicum circumdantium." Isotype, *Sessé, Mociño, Castillo, & Moldonado* in 1787, 1795 or 1804, *F 845304. R. dichotomus* var. *limnobius* Briq. Ann. Conserv. & Jard. Bot. Genève 11 & 12: 178. 1908 has not been seen. It is based upon the following collection: "Mexicum: Civitas Oaxaca, in lacibus cordillerae ad 7000', maj. 1840 fl. Galeotti n. 4542)."

26 RANUNCULUS SIBBALDIOIDES H. B. K. ex DC. Syst. 1: 293. 1818

Subglabrous to copiously hirsute subpalustrine perennials; roots not thickened, 1-2 mm. in diameter; stems scapose or the leafy portions short, prostrate, not rooting, up to 1 dm. long, 1-1.5 mm. in diameter, unbranched, not fistulous, thinly to moderately hirsute, scarcely exceeding the leaves; basal leaves

pinnate at the bases, pinnatifid above, oblong-ovate, 2-4 cm. long, 1-2.7 cm. broad, the leaflets and divisions lobed, the blades proximally cordate and the segments all broadly rounded, petioles up to 8 cm. long, subglabrous or hirsute, the stipular leaf bases as long as the free portions of the petioles, up to 4 cm. long; cauline leaves at least sometimes opposite when present, long-petioled; pedicels up to 1 dm. long in flower and in fruit, usually appressed-pubescent above; sepals 5, greenish-yellow, spreading, ovate-lanceolate, 6 mm. long, about 2 mm. broad, thinly pilose, about half the length of the petals, promptly deciduous; petals 5-9, oblanceolate-cuneate, 10-13 mm. long, 2.5-5 mm. broad; stamens about 15-20; achenes about 10 in a subglobose cluster 5 mm. long, 5 mm. in diameter, each achene obovate, 2.5 mm. long, 2 mm. dorsoventrally, 1 mm. laterally, smooth, glabrous, the margin inconspicuous, the beak very stout, gradually tapering its whole length, 1.5 mm. long, straight; receptacle cylindroid-obovoid, 1-2 mm. long in flower, 2 mm. long in fruit, glabrous or hispidulous.

Wet ground particularly of lake borders at 12,000 to 15,000 feet elevation. The highest mountains rimming the Valley of Mexico and in Vera Cruz.

Specimens examined.—MEXICO: Nevado de Toluca, *Rose & Painter 7974, US, Moore 90* in 1940, *GH, Kenoyer A478, F;* Ixtaccihuatl, *Purpus 224* in 1904, *GH, F, US, UC, Mo, 1672* in 1905, *NY, 61* in 1903, *US* (in part), *Mo, UC.*

VERA CRUZ: Cofre de Perote, 14,000 feet, *Balls 4622, UC, US.*

Type collection.—"Hab. in montibus excelsis (Quindiu seu Antisana) Americae meridionalis. *Humb. et Bonpl.* . . . v. s. in h. H. B.)."

Section 2 ECHINELLA DC

Echinella, as section, DC. Prodr. 1: 41. 1824.

Glabrous or sometimes hairy terrestrial annuals or perennials. Basal leaves lobed, parted, or divided, the cauline similar or reduced. Sepals green or yellow. Petals 1, 2, or usually 5, yellow, the nectary scale truncate, entire. Achenes 5 or 10-25 in a capitate cluster, discoid, the dorsoventral measurement 3-6 times the lateral; pericarp faces or margins spiny or the faces merely papillate (sometimes smooth in *R. Sardous*), glabrous or the papillae produced into hooked hairs; the margin often raised into an unusually distinct border; styles present, the achenes beaked. Receptacles of most species but slightly enlarged in fruit.

Type species, *Ranunculus arvensis* L.

KEY TO THE SPECIES

1. Petals 1-3 mm. long; mature achenes papillate, the papillae produced into slender hooked spines or hooked hairs; nectary scale free laterally.
   2. Papillae of the achenes produced into hooked hairs; petals usually 1, 2, or none, sometimes more. (The *Ranunculus hebecarpus* group.) .....27. *R. hebecarpus.*
   2. Papillae of the achenes produced into hooked slender spines; petals 5. (The *Ranunculus parviflorus* group.) .....28. *R. parviflorus.*

1. Petals at least 4 mm. long*; mature achenes either papillate or with straight or curved but not hooked stout spines, when papillate the papillae not produced into hairs or spines, rarely smooth.

2. Mature achenes papillate or rarely some or perhaps all of them smooth. (The *Ranunculus Sardous* group.)

3. Basal leaf blades 2-3 cm. long, 2-2.5 cm. broad; petals 8-9 mm. long, 5-7 mm. broad, the nectary scale free laterally; stamens 25-50 .....29. *R. Sardous.*

3. Basal leaf blades 5-8 cm. long, 3-6 or 7 cm. broad; petals about 5 mm. long, 2-3 mm. broad, the nectary scale free distally but forming a pocket basally .....30. *R. trilobus.*

2. Mature achenes with stout spines on the margin or faces.

3. Achenes with no spines on the margins, the faces spiny; nectary scale forming a pocket, much narrower than the adjacent petal surface. (The *Ranunculus muricatus* group.) .....31. *R. muricatus.*

3. Achenes with the margins produced into long spines, the faces with short spines; nectary scale not forming a pocket, broader than the adjacent petal surface. (The *Ranunculus arvensis* group.) .....32. *R. arvensis.*

27 RANUNCULUS HEBECARPUS Hook. & Arn. Bot. Beech. Voy 316. 1840

Ranunculus parviflorus L. var. Torr. & Gray, Fl. N. Amer. 1: 25. 1838. *Ranunculus hebecarpus* var. *pusillus* Brew. & Wats. Bot. Calif. 1: 9. 1876.

Pubescent terrestrial annuals; roots filiform, 0.1-0.5 mm. in diameter; stems erect, not rooting, 1-2 or 3 dm. long, 0.5-2 mm. in diameter, freely branching, not fistulous, commonly very delicate, pilose; basal leaf blades simple, cordate-reniform in outline, 6-15 mm. long, 12-22 mm. broad, deeply 3-parted and again lobed, the ultimate lobes acute, the blades proximally cordate and distally rounded, densely appressed-pubescent, the petioles 3-9 cm. long, pilose, the stipular leaf bases 0.5-1 cm. long; cauline leaves alternate, similar to the basal, petioled, bracts 3-parted, the parts entire; pedicels 1-6 mm. long in flower, 10-26 mm. long in fruit, pubescent; sepals yellow, broadly scarious-margined, spreading, obovate, 1.5 mm. long, 1 mm. broad, pilose, the length of the petals; petals 1, 2, 5, or none, yellow, spatulate, 1.5 mm. long, 0.7 mm. broad, the nectary scale glabrous, deltoid, not forming a pocket; stamens 8-15; achenes 4-10 in a globose cluster 4-5 mm. in diameter, each achene discoid, 2 mm. long, 2 mm. dorsoventrally, 0.3 mm. laterally, the pericarp faces reddish brown, papillate, the papillae produced into hooked bristles, the margin prominent but not strongly thickened, the beak stout, 0.6 mm. long, hooked at the tip; receptacle ovoid, 0.3 mm. long in flower, 0.6 mm. long in fruit, glabrous.

Shade of trees at 200 to 2,500 or 3,000 feet elevation; largely in the California Oak Woodland. Latah County, Idaho; Klickitat and Garfield counties, Washington; Oregon in the Columbia River Gorge and occasionally in the southwestern part of the state; Siskiyou and Modoc counties and the whole foothill region of cismontane California, except the redwood belt; Santa Catalina Island; one specimen attributed to "Arizona"; northern Baja California and Guadaloupe Island. March to May.

* Cf. data concerning elongation of petals during anthesis under *R. macranthus*, pp. 104-5.

Significant specimens.—WASHINGTON: KLICKITAT CO. West Klickitat County, *Suksdorf* in 1883, *DS, PA;* White Salmon, *Suksdorf 228* in 1880, *GH, 460* in 1883, *WSC;* Bingen, *Suksdorf 5930, WSC,* in 1890, *WSC;* Lyle, *Suksdorf* in 1890, *WSC.* GARFIELD CO. Wawawai, *Piper 3821, WSC, GH, Elmer 75* in 1897, *Ill, Mo, Pom, St. John 5930, WSC, UC, C. N. Jones 2042, GH.* COUNTY UNCERTAIN. Dry hillsides in Eastern Washington, Snake River, *E. R. Lake* in 1892, *Wash.*

IDAHO: LATAH CO. Potlatch River below Juliaetta, *Henderson 4840, DS, GH.*

OREGON: Woodville, *J. Howell* in 1889, *PA.* HOOD RIVER CO. East line of Hood River County, *Henderson 521* of 1924, *Mo, UO.* WASCO CO. The Dalles, *Lunell* in 1906, *RM, Ill, US, Sheldon 10099, Pom, DS, GH, Mo.* DOUGLAS CO. Myrtle creek, Umpqua Valley, *Howell* in 1887, *HGr, UC, Wash, GH,* in 1890, *HGr, 1058, Mo;* Roseburg, *Peck 14800, WillU, Clo.* JOSEPHINE CO. Savage Creek, Grants Pass, *Henderson 6025, UO, CAS, Mo, DS, RM.* JACKSON CO. Sam's Valley, *Henderson 12414, UO, PA;* Weimer, *Hammond 7a* in 1893, *US;* Table Rock near Medford, *J. W. Thompson 10325, Wash, Mo.*

ARIZONA: *W. F. Parish* in 1882, *DS.*

MEXICO. BAJA CALIFORNIA: Northern Lower California, *Orcutt* in 1886, *NY, PA, US, GH, Mo* (?); Guadaloupe Island, *Palmer 1* in 1875, *Mo, NY, GH, PA,* Greene in 1885, *HGr.*

Type collections.—(1) Unnamed variety, Torr. & Gray, "2. California, *Douglas!*" Isotype, *GH.* (2) *R. hebecarpus,* "California—Supplement. Where not otherwise mentioned, it is to be understood that the following species are from the collection of Mr. Douglas. They were presented by the Horticultural Society of London, in whose service Mr. Douglas was at the time he gathered them." Type at Kew, photograph *DS;* isotypes, *NY, GH.* (2) Var. *pusillus.* No type given. This and the typical species were reported from the "coast-ranges and foothills of the Sierra Nevada." No plants of *Ranunculus hebecarpus* warrant segregation as a variety.

28 RANUNCULUS PARVIFLORUS L. Sp. Pl. ed. 2. 1: 780. 1762

Ranunculus trachyspermus Ell. Sketch. 2: 65. 1816. *Ranunculus parviflorus* var. *dimidiatus* Krause, Beih. Bot. Cent. 32(2): 330. 1914.

Hirsute terrestrial annuals; roots slender; stems erect, not rooting, 1-3 dm. long, 1-2 mm. in diameter, freely branching, not fistulous, thinly hirsute; basal leaf blades simple, reniform, 1.5-2 cm. long, 2-2.5 cm. broad, 3-parted or -divided and again lobed, proximally cordate, distally rounded, the ultimate lobes acute, hirsute with fine hairs, the petioles 3-6 cm. long, pilose, the stipular leaf bases about 1 cm. long; cauline leaves alternate, similar to the basal, the bracts 3-parted, short-petioled; pedicels 1-4 mm. long in flower, 3-18 mm. long in fruit, pubescent; sepals greenish-yellow, spreading, narrowly ovate, 1 mm. long, less than 1 mm. broad, densely pubescent, nearly the length of the petals, promptly deciduous; petals 5, yellow, narrowly elliptic, 1-2 mm. long, less than 1 mm. broad, the nectary scale glabrous, free laterally, truncate; stamens about 10; achenes 10-20 in a globose head about 4 mm. in diameter, each achene obovate, 1.5 mm. long, 1.1 mm. dorsoventrally, 0.3 mm. laterally excluding the reddish-brown papillae which cover both faces of the pericarp and which are produced into minute slender hooks, the margin strongly marked, the beak deltoid, 0.5 mm. long, recurved; receptacle globose, less than 1 mm. long in flower, 1-1.3 mm. long in fruit, glabrous.

Waste ground; native of the Old World naturalized in North America, in the Pacific, Deciduous, and Southeastern Pine forests. Humboldt and Monterey counties, California; central Arkansas and Houston, Texas, to Lex-

ington, Kentucky, and to Maryland and extreme northern Florida; Peekskill, New York; Bermuda; at 4,500 to 5,000 feet elevation in Jamaica and Haiti. Summer.

Significant specimens.—CALIFORNIA: *Brandegee, UC.* HUMBOLDT CO. Blue Lake, *J. P. Tracy 6053, UC, Pom;* Carlotta, *J. P. Tracy 8067, J, UC;* Fortuna, *J. P. Tracy 5861, NR.* MONTEREY CO. Pacific Grove Museum Herbarium, *McCord* in 1905, *CAS.*

KENTUCKY: Lexington, *Short* in 1837, *NY.*

NEW YORK: WESTCHESTER CO. Peekskill, *LeRoy, NY.*

MARYLAND: WORCESTER CO. Berlin, *Canby* in 1868, *PA.*

FLORIDA: GADSDEN CO. Chattahoochee, *A. H. Curtiss 47, GH;* River Junction, *A. H. Curtiss 6400, DS, UC, NY, Ill, GH.*

BERMUDA: Various collectors.

JAMAICA: Cinchona, *W. Harris 8585, NY;* near Cinchona, *W. Harris 12389, NY, Mo, US.*

HAITI: LaSelle Mountains, Port au Prince, *Ekman 5884, US.*

Type collections.—(1) *R. parviflorus.* "*Habitat in* Europae *australis.*" (2) *R. trachyspermus,* "Collected in St. John's Berkley, by Dr. Macbride." Near Savannah, Georgia. Type in Herbarium of the Charleston Museum, photographs *GH, Pom-B.* (3) Var. *dimidiatus, Krause* "No. 5567. Bei Virginia Beach am 13 Mai." Virginia, 1890.

29 RANUNCULUS SARDOUS Crantz, Stirp. Austr. ed. 1. fasc. 2. 84. 1763

R. parvulus L. Mant. Pl. 79. 1767.

Hirsute terrestrial perennials; roots filiform, 0.5 mm. in diameter; stems suberect, not rooting, 1-5 dm. long, 1.5-2 mm. in diameter, branching freely, not fistulous, hirsute; basal leaf blades pinnately compound, broadly cordate in outline, 2-3 cm. long, 2-2.5 cm. broad, the 3 leaflets parted and lobed, the ultimate segments deltoid, pubescent, proximally cordate or truncate and distally rounded, appressed-pubescent, the petioles 3-16 cm. long, hirsute, the stipular leaf bases 1-1.5 cm. long; cauline leaves alternate, the bracts of about 3 linear divisions, sessile; pedicels 3-5 cm. long in flower, 2-6 cm. long in fruit, thinly appressed-hairy; sepals greenish-yellow, reflexed, ovate-attenuate, 3-5 mm. long, 1.5-2 mm. broad, pilose, three-fifths the length of the petals, promptly deciduous; petals 5, yellow, 8-9 mm. long, 5-7 mm. broad, the nectary scale glabrous, free laterally, truncate; stamens 25-50; achenes 12-25 in a subglobose head 4-6 mm. long and 5-8 mm. in diameter, each achene nearly circular, 2-3 mm. long, 2-3 mm. dorsoventrally, 0.2 mm. laterally, usually sparsely papillate or some achenes of the same plant smooth, glabrous, the margin strongly marked, the beak deltoid, 0.3 mm. long, curved at the tip; receptacle pyriform, 1 mm. long in flower, 2 mm. long in fruit, covered with long white hairs.

Waste places; native of the Old World naturalized mostly about seaports in North America. St. John, New Brunswick; Columbia River at Portland, Oregon; Fortuna, Humboldt County, California; St. Louis; New York; Philadelphia; Norfolk and Meherrin River, Virginia; "eastern" North Carolina; Savannah and Tybee Island, Georgia. May to July.

This species is related to *R. bulbosus,* and it is a connecting link to the section *Chrysanthe.*

Specimens examined.—NEW BRUNSWICK: St. John, *Hay* in 1884, *Can.*

OREGON: MULTNOMAH CO. Lower Albina, Portland, *Sheldon 9579, NR, 9829, NR, 10585, NR* (probably all the Oregon collections *UO*).

CALIFORNIA: HUMBOLDT CO. Fortuna, *Feudge 140* in 1923, *Pom, J. P. Tracy 5861, UC;* Eel River Valley near Grizzly Bluff, *J. P. Tracy 16080, UC.*

MISSOURI: ST. LOUIS CO. St. Louis, *Sherff 210, GH.*

PENNSYLVANIA: Ballast at Philadelphia, *Martindale* in 1877, *GH*, in 1878, *US*, Merideth in 1921, *GH.*

NEW YORK: New York City, *A. Brown* in 1879, *GH.*

NEW JERSEY: CAMDEN CO. Ballast at Camden, *Martindale* in 1879, US, in 1880, *US.*

VIRGINIA (Southeastern): Westland, *Hermann 10572, GH;* Jarratt, *Fernald & Long 14151, GH.* BRUNSWICK CO. Haley's Bridge, *Fernald & Long 8265, GH.* SOUTHAMPTON CO. Franklin, *Fernald & Long 9933, GH.* NORFOLK CO. Norfolk, *N. L. & E. G. Britton & Vail* in 1892, *NY.*

NORTH CAROLINA: Eastern North Carolina, *McCarthy* in 1885, *NY;* Linnville, *Welch 2300, Clo.* DURHAM CO. Durham, *L. E. Anderson 6284, US.* NEW HANOVER CO. Wilmington, *McCarthy* in 1885, *Pom-B, US* (probably the same as the collection cited above).

SOUTH CAROLINA; COLLETON CO. Yemassee, ... in 1912, *PA*, ... in 1913, *PA.*

GEORGIA: CHATHAM CO. Savannah, *Canby* in 1869, *GH, US, PA, C. S. Williamson* in 1895, *PA, W. H. Duncan 2177, Clo, Kolthoff* in 1927, *Pom, T. & F. Craig 3274, Pom;* dunes at Tybee Island, *Small 8484, NY;* Hutchinson's Island, *Miller & Maguire 621, Utah.*

ALABAMA: TUSCALOOSA CO. Tuscaloosa, *E. A. Smith* in 1875, *US.*

Type collections.—(1) *R. Sardous*, "Abundat tota Austria." (2) *R. parvulus* "Habitat Monspelii *inque* Italia."

30 RANUNCULUS TRILOBUS Desf. Fl. Atl. 1: 437. *pl. 113.* 1798
(An. VI of the French Revolution)

Pubescent or sometimes glabrous terrestrial annuals; roots fibrous, 1 mm. or less in diameter; stems erect or reclining, not rooting, 1 or 5 dm. long, about 2-3 mm. in diameter, fistulous; basal leaves pinnate, with 3 leaflets, cordate-ovate in outline, 5-8 cm. long, 3-6 or 7 cm. broad, the leaflets cleft or parted and again crenately toothed or shallowly lobed, the leaf proximally cordate and distally rounded, sparsely appressed-hispid; cauline leaves similar but reduced; pedicels 1-4 cm. long in flower, 2-6 cm. long in fruit; sepals reflexed, ovate-acute, about 3 mm. long, two-thirds the length of the petals; petals 5, narrowly obovate, about 5 mm. long, 2-3 mm. broad, the nectary scale free distally but forming a pocket basally; stamens about 10-20; achenes 15-25 in an ovoid head about 8 mm. long and 5-6 mm. in diameter, each achene about 2 mm. long, the border raised, bevelled on the margin, the sunken faces strongly tuberculate, glabrous; receptacle ellipsoid, 1 mm. long in flower, about 4 mm. long in fruit, pubescent.

Mediterranean Region; naturalized or sporadic in Bermuda.

Some European authors consider this to be *Ranunculus Sardous* Crantz var. *trilobus* (Desf.) Ruoy. The writer has not sufficient data to judge the status of this entity.

Specimens examined.—BERMUDA: "Chiefly from St. George's Island, a few from St. David's Island and Pembroke Marsh," *Fellows* in 1909, *GH*.

Type collection.—"HABITAT in arvis humilis prope Mayane." Myane, Barbary, *Desfontaines*.

31 RANUNCULUS MURICATUS L. Sp. Pl. 555. 1753

Ranunculus echinatus Vent. Jard. Cels. 73. 1800 (An. VIII of the French Revolution). *Ranunculus muricatus* var. *carolinianus* DC. Prodr. 1: 42. 1824, not *R. carolinianus* DC. in 1818.

Glabrous terrestrial annuals or perhaps perennials; roots about 0.7 mm. in diameter; stems reclining or erect, not rooting, 2-5 dm. long, 2-5 mm. in diameter, freely branching, not markedly fistulous; basal leaf blades simple, broadly cordate or reniform or semicircular, 2-5 cm. long, 2-6 cm. broad, deeply 3-parted, the parts again shallowly crenately lobed, proximally cordate or truncate and distally rounded, petioles 4-15 cm. long, stipular leaf bases 1 or 2 cm. long; cauline leaves alternate, similar to the basal, petiole; pedicels 5-20 mm. long in flower, 2-6 cm. long in fruit, glabrous; sepals greenish, spreading, ovate, mucronate, 4-7 mm. long, 2-3 mm. broad, with a few bristles, almost the length of the petals, promptly deciduous; petals 5, yellow, obovate, 5-8 mm. long, 3-4 mm. broad, the nectary scale glabrous, forming a pocket, much narrower than the adjacent part of the petal, truncate; stamens few; achenes 10-20 in a globose cluster 10-13 mm. in diameter, each achene obovate, 5.5 mm. long, 3.5 mm. dorsoventrally, 0.8 mm. laterally, covered with stout, curved spines, glabrous, the margin very prominent, keeled, spineless, produced into the stout beak, this 2-2.5 mm. long, falcate; receptacle subglobose, about 1 mm. long in flower, 2 mm. long in fruit, hispid.

Meadows, stream and lake borders, and vernal rivulets at low elevations. Native of the Old World naturalized in North America in the Pacific Forest, the California Oak Woodland, and the Deciduous, Southeastern Pine, and Riverbottom forests. Puget Sound and Bingen, Washington; Portland, Newport, Port Orford, and Umpqua Valley, Oregon; Del Norte, (western) Lake, Shasta, and Butte counties to the southern tip of San Francisco Bay and Tuolumne County and also in Mariposa County and possibly San Diego County, California; Arkansas and southeastern Texas to South Carolina; Bermuda; once at least sporadic in Mexico, but not collected for more than a century.

Significant specimens.—WASHINGTON: KING CO. Seattle, *O. B. Johnson* in 1888, *Wash*, *Piper* in 1889, *Wash*, *Moffat Collection* in 1891, *Ill*, *Lovitt* in 1910, *Wash*; Bailey Peninsula (King Co. ?), *Lovitt* in 1910, *Wash*. KLICKITAT CO. Bingen, *Suksdorf 13689*, *WSC*.

OREGON: MULTNOMAH CO. Albina, Portland, *Suksdorf 3227*, *WSC*. LINCOLN CO. Newport, *Peck 16142*, *WillU*. DOUGLAS CO. Umpqua Valley, *Howell* in 1881, *UO*, *GH*; Roseburg, *Gilkey* in 1936, *Clo*, *Wash*, *OSC*; Myrtle Creek, *Howell* in 1887, *Wash*, *UO*; Canyonville, *Howell* in 1881, *UO*. CURRY CO. Port Orford, *Henderson 10206*, *UO*, *Peck 4992*, *WillU*, *Wash*. COOS CO. Bandon, *Rees* in 1944, *WSC*.

CALIFORNIA: Southern outposts, as follows: MARIPOSA CO. Blochman's Ranch, *Eastwood 4371*, *CAS*. SAN DIEGO CO. San Diego Botanical Garden (likely in cultivation), Brandegee in 1896, *UC*.

MEXICO: *Sessé*, *Mociño*, *Castillo*, & *Moldonado* in 1787, 1795, or 1804, *F*.

BERMUDA: Numerous collections.

Type collections. "(1.) *R. muricatus*, "*Habitat in* Europae *australis fossis & humentibus.*" (2.) *R. echinatus*, ". . . Environs de Charles-Town, cultiveé chez cels de graines rapportées par Bosc. . . ." Charleston, North Carolina. (3.) Var. *carolinanus*, "Carolinâ et Virginiâ."

32 RANUNCULUS ARVENSIS L. Sp. Pl. 555. 1753

Thinly hirsute terrestrial annuals; roots stout, about 1 mm. in diameter; stems erect, not rooting, 1.5-5 dm. long, about 2 mm. in diameter, branching, stout, not fistulous, sparsely hirsute; cotyledons small, entire, tardily deciduous, basal leaf blades simple, 1.5-3.5 cm. long, 1.5-4.5 cm. broad, cuneate and apically toothed or deeply 3-parted and the lobes oblanceolate and apically shallowly lobed, proximally acute and distally more or less truncate, glabrous or appressed-pubescent, the petioles 1-5 cm. long, thinly hirsute, the stipular leaf bases about 1 cm. long; cauline leaves alternate, numerous, compound, the leaflets again deeply 2-parted and again lobed, oblanceolate, the lower leaves petioled; pedicels 1-3.5 cm. long in flower, 2-5 cm. long in fruit, pubescent; sepals greenish-yellow, spreading, narrowly elliptic, 4-7 mm. long, 1.5-2 mm. broad, appressed-hispid, two-thirds the length of the petals, promptly deciduous; petals 5, yellow, obovate, 6-8 mm. long, 3-3.5 mm. broad, the nectary scale glabrous, laterally free, not forming a pocket, truncate, 0.7 mm. long, 0.9 mm. broad, broader than the adjacent part of the petal; stamens 10-15; achenes 5 in a whorl about 8-9 mm. in diameter, each achene obovate, short-stalked, 5 mm. long, 3 mm. dorsoventrally, less than 1 mm. laterally, the faces with short spines, the prominently thickened margin with spines 2-3 mm. long, finely pubescent, the beak stout, 2.5-3 mm. long, tending to curve dorsally its whole length; receptacle 1 mm. long in flower, 1-2 mm. long in fruit, a little pubescent at the summit.

Waste ground and ballast; European weed; naturalized in North America. Yamhill and Marion counties, and "Southern" Oregon; Potter Valley, Mendocino County, Green Valley, El Dorado County, and Mt. Bullion, Mariposa County, California; Howard Creek and Grangeville, Idaho; Cache, Salt Lake, and Utah counties, Utah; Columbus, Ohio; metropolitan New York and adjacent New Jersey; Washington, D. C.; Georgia. Summer.

Specimens examined.—OREGON: MULTNOMAH CO. Linnton near Portland, *Suksdorf 1821, WSC.* YAMHILL CO. Amity, *Dissmore* in 1920, *OSC.* MARION CO. Lake Labish, *Peck 640, WSC, 6420, WillU;* Chomawa, *J. C. Nelson 4253, OSC, PA, WSC.* "SOUTHERN OREGON." *S. F. Blake, OSC.*

CALIFORNIA: MENDOCINO CO. Potter Valley, *Eastwood 12668, CAS, A. Hastings* in 1940, *SRJC, M. S. Baker 9568, SRJC.* EL DORADO CO. Green Valley, *Wolf 4962, SD, WSC.* MARIPOSA CO. Mt. Bullion, *Johns* in 1915, *UC.*

IDAHO: Camp Cougar Road, Howard Creek, *M. & L. Dillon 614, WSC, ISB, Wash.* IDAHO CO. Grangeville, *R. J. Davis 252-37, Utah, ISB, WSC, Sharsmith 3618, Pom-B, WSC.*

UTAH: CACHE CO. Smithfield, *Maguire 13677* in 1936, *Utah, Wash, WSC, GH;* Newton, *W. W. Jones 386, GH, UC.* SALT LAKE CO. Pharoah's Glen, Parley Canyon, *Garrett* in 1907, *Pom, Gar;* Salt Lake City, *Garrett* in 1907, *Pom.* UTAH CO. Provo, *Harrison & Galway 10567* in 1943, *Clo.*

OHIO: Columbus ("introduced with packing material"), *Werner* in 1888, *GH.*

METROPOLITAN NEW YORK AND ADJACENT NEW JERSEY: Various collectors.
DISTRICT OF COLUMBIA: Washington, *Vasey* in 1877, *US*.
GEORGIA: "Geo.", Boykin, *GH*.

Type collection.—"*Habitat in* Europae *australioris agris.*"

Section 3 EPIROTES (Prantl) L. Benson

Auricomus, as subgenus, Spach. Hist. Nat. Veg. 7: 210. 1839.
Epirotes, as subsection, Prantl. in Engl. Bot. Jahrb. 9: 266. 1888.
Epirotes, as section, L. Benson, Amer. Jour. Bot. 23: 169. 1936.

Glabrous or sometimes hairy terrestrial perennials. Basal leaves deeply toothed or lobed, parted, or divided, the cauline similar or reduced to small, entire bracts (in one variety the basal leaves entire but the cauline parted; in two Mexican species the leaves apically toothed or a few entire). Sepals green or yellow, usually dorsally lightly tinged with lavender or rarely red or purple. Petals 5, rarely 10, yellow (white in one European species); nectary scale truncate, forming a pocket, entire. Achenes 10-20 or commonly 50-150 in a cylindroid or ovoid spike or head, each achene obovoid, the dorsoventral measurement not more than twice the lateral; pericarp smooth, glabrous or pubescent; styles present, the achenes beaked. Receptacle much enlarged in fruit.

Type species, *Ranunculus alpestris* L.

KEY TO THE SPECIES

1 Head of achenes cylindroid, ovoid, or globose, if globose 2.5-7 mm. in diameter, the horizontal diameter never in any case more than 9 mm.

2. Roots not thickened markedly into storage organs, sometimes of varying diameter.

3. Sepals covered dorsally with dense, conspicuous, long, *reddish-brown* hair (at least reddish-brown in all dried specimens, except possibly in some of the rare alpine *R. Macaulevi* var. *Brandegeei* from south-central Colorado). (The *Ranunculus nivalis* group.)

4. Basal leaf blades reniform to cordate, semicircular, or nearly orbicular, palmately lobed or parted; petals obovate.

5. Receptacle glabrous; achene body about 1.5 mm. long, (Arctic.) ..... 33. *R. nivalis*.

5. Receptacle brown-hispid; achene body occasionally 1.5 but ordinarily 1.8-2 mm. long. (Arctic.) ..... 34. *R. sulphureus*.

4. Basal leaf blades very narrowly elliptic to oblong or sometimes obovate, toothed at the apices, petals cuneate; receptacle glabrous. (Southern Colorado and Northern New Mexico.) ..... 35. *R. Macaulevi*.

3. Sepals not covered dorsally with *reddish brown* hair.

4. Petals when fully expanded* 4-18 mm. long or in plants with canescent achenes (*R. inamoenus*) rarely shorter.

5. Achenes swollen or broadened at the bases and therefore obovoid-oblong.

6. Fruiting receptacle and head of achenes cylindroid or ovoid; herbage

* Cf. data on elongation of petals during anthesis under the discussion of *R. macranthus*, pp. 104-5.

and receptacle glabrous; achene beaks 0.5-1.5 mm long; basal leaves lobed and parted to finely dissected; stems 1-3- or 5-flowered.

7. Achene beaks straight, 1-1.5 mm. long; petals, when fully expanded*, at least 40 percent longer than the sepals, 8-18 (rarely 5) mm. long; basal leaves truncate or rounded at the bases.

8. The 3 primary divisions of the basal leaves once-lobed or the middle one entire; head of achenes cylindroid or ovoid-cylindroid. (Alaska to California and the Rocky Mountains.) ..... 36. *R. Eschscholtzii.*

8. The 3 primary divisions of the basal leaves twice-divided into linear divisions; head of achenes ovoid. (Cf. also the vars. *Suksdorfii* and *trisectus* of *R. Eschscholtzii* for forms intergrading to *R. adoneus* var. *alpinus*.) (Rocky Mountains.) ..... 37. *R. adoneus.*

7. Achene beaks recurved, 0.5 mm. long; petals, when fully expanded, not or but slightly exceeding the length of the sepals, not more than 5 mm. long; basal leaves deeply cordate at the bases. (Alaska to Oregon and Montana.) ..... 38. *R. verecundus.*

6. Fruiting receptacle and head of achenes subglobose; herbage and receptacle pilose-hirsute; achene beaks 0.3 mm. long; stems about 3-12-flowered. (Northern Great Plains and Prairie.) (The *Ranunculus auricomus* group.) ..... 44. *R. rhomboideus.*

5. Achenes obovoid, flattened-obovoid, or discoid, not swollen or flat-stiped at the bases.

6. Petals 2 or mostly 4-6 (or rarely 8) mm. long (the petals very rarely wanting in *R. pedatifidus*); achenes glabrous; stems 1-4- or 6-flowered.

7. Achenes about 2.5 mm. long, 2 mm. dorsoventrally; basal leaves deeply subcordate at the bases, divided and again cleft or parted and lobed; fruiting receptacle 2.5-5 mm. long; stems 1-4-flowered. (Asia; western American Arctic; Rocky Mountains.) (Nearest the *Ranunculus nivalis* group.) ..... 39. *R. gelidus.*

7. Achenes about 1.5 mm. long, 1.2-1.3 mm. dorsoventrally up to 2.3 mm. long and 1.7 mm. dorsoventrally in *R. inamoenus* var. *subaffinis*, which is known only from Mt. San Francisco, Arizona); basal leaves proximally attenuate to acute, obtuse, or rounded or very rarely some of them subcordate. (The *Ranunculus auricomus* group.)

8. Sepals and usually the pedicels densely tomentose. (Arctic America.) ..... 41. *R. Sabinei.*

8. Sepals and pedicels glabrous or thinly pilose.

9. Achenes 20-45 in a head 4-6.5 mm. long; achene beak 0.3-0.7 mm. long; stems 1-3-flowered; basal leaf blades reniform or semicircular, mostly broader than long. (James Bay to Labrador and Quebec.) ..... 42. *R. Allenii.*

9. Achenes mostly 60-100 in a head 7-17 mm. long; achene beak 0.8-0.9 mm. long; stems 3-7- or 11-flowered; basal leaf blades obovate to orbicular or sometimes reniform and broader than long. (Rocky Mountains.) ..... 43. *R. inamoenus.*

6. Petals 6 or 8-18 mm. long or (in plants with canescent achenes or with 5-11-flowered stems) sometimes shorter (very rarely none in *R. pedatifidus*. (The *Ranunculus auricomus* group.)

7. Basal leaf blades greatly elongate, lanceolate, oblanceolate, or narrowly oblong, apically 3- or sometimes 5-7-toothed or rarely a few of the leaves entire. (Mexico.) ..... 45. *R. Forreri.*

7. Basal leaf blades not proportionately greatly elongate, ovate to cordate or reniform.
8. Achenes canescent.
9. Nectary scale and the petal glabrous.
10. Achenes 40-100 in a cylindroid or barrel-shaped head 7-17 mm. long and 5-8 mm. in diameter; stamens about 25-60.
11. Petals narrow, sepals glabrous or thinly appressed-pubescent; some of the basal leaves proximally attenuate, acute, or obtuse; at least some basal leaves on each plant crenate, occasional leaves 3-lobed or -divided; petals narrow. (Rocky Mountains.) ..... 43. *R. inamoenus.*
11. Petals broadly cuneate-obovate; sepals pilose-tomentose; basal leaves proximally cordate.
12. Receptacle glabrous or rarely sparsely puberulent, 2.5-3.5 mm. long in fruit; basal leaf blades markedly broader than long, merely crenately toothed to 3-5-divided and again lobed and toothed; achenes 10-20 or 30 in an ovoid-globose head, each 2.5-3 mm. long; stems and petioles glabrous or very sparsely hirsute. (Greenland; Old World.) ..... 50. *R. auricomus.*
12. Receptacle canescent, 7-9 mm. long in fruit; basal leaf blades only slightly broader than long, nearly always pedately divided or parted into 5-7 linear divisions some of which are again lobed; achenes 25 or usually 40-70 in a cylindroid head, each about 2 mm. long; stems and petioles markedly to sparsely pilose. (Arctic; Rocky Mountains.) ..... 51. *R. pedatifidus.*
10. Achenes 5-10 in a subglobose cluster about 4 mm. in diameter; stamens 12-20. (Northwestern Mexico.) ..... 46. *R. Gentryanus.*
9. Nectary scale ciliate (except possibly rarely in *R. arizonicus* var. *typicus*), the adjacent surface of the petal sometimes hairy also.
10. Petals oblanceolate-obovate, usually 2-3 times as long as broad; fruiting receptacle slender; dead leaf bases represented by numerous brown fibers, the basal leaves usually not persisting at flowering time; plants of dry situations. (Arizona, New Mexico, and Mexico.) ..... 47. *R. arizonicus.*
10. Petals obovate, cuneate-obovate, or obovate-deltoid, nearly or fully as broad as long; fruiting receptacle ovoid to ovoid-cylindroid; dead leaf bases only moderately separated into fibers; plants of mountain meadows.
11. Petals broadly cuneate-obovate, 8-15 mm. long; basal leaves cordate, the apices lobed or very rarely parted; the bases cordate; petioles of the basal leaves 5-10 or 16 cm. long. (Rocky Mountains.) ..... 48. *R. cardiophyllus.*
11. Petals oblanceolate-obovate, 5-10 mm. long; basal leaves ovate, shallowly crenately toothed, the bases acute or obtuse; petioles of the basal leaves 8-18 cm. long. (Colorado.) ..... 49. *R. coloradensis.*
8. Achenes glabrous.

9. Margins of the nectary scale prolonged into 2 flaps attached most of their length to the blade of the petal, each flap 4-5 mm. long and about 0.6 mm. broad; leaves dissected; plant practically glabrous. (Northwestern Alaska.) ..... 52. *R. Eastwoodianus.*

9. Margins of the nectary scale not prolonged (or sometimes somewhat so in *R. auricomus*, Greenland).

10. Achenes 40-70 in a cylindroid head 8-10 mm. long and 5-6 mm. in diameter, the fruiting receptacle 7-9 mm. long; basal leaf blades pedately parted into 5-7 linear lobes some of which are again lobed. (Arctic and the Rocky Mountains) ..... 51. *R. pedatifidus.*

10. Achenes 20-35 or 50 in a subglobose to ovoid or ovoid-cylindroid head 2.5-8 or 10 mm. long and 2.5-6 mm. in diameter, the fruiting receptacle 2-4 mm. long; basal leaf blades crenate, laciniate-dentate, or rarely deeply serrate.

11. Basal leaves ovate or oblong or sometimes an occasional one cuneate or cuneate-obovate, the lobes thickened-revolute; stems 1-3-flowered; sepals not markedly reddish-purple. (Mexico.) ..... 53. *R. montigenitus.*

11. Basal leaves reniform to cordate-ovate, orbicular, or nearly semicircular, proximally cordate, the lobes not thickened-revolute; stems 1-10-flowered.

12. Petals obovate-obdeltoid, 8-10 mm. long, 6-7 mm. broad; pedicels densely tomentose or tomentulose to pilose; basal leaves orbicular, orbicular-cordate, cordate-ovate, or semicircular or reniform, longer than broad or as long as broad.

13. Achenes 2.5-3 mm. long; roots 0.2-0.6 mm. in diameter; stems usually not scapose; basal leaves reniform at least in outline, crenately toothed to 3-5-divided; sepals not markedly reddish-purple; receptacle usually glabrous. (Greenland and Old World.) ..... 50. *R. auricomus.*

13. Achenes about 2 mm. long; roots 1-2.2 mm. in diameter; stems scapose; basal leaves orbicular, orbicular-cordate, cordate-ovate, or occasionally semicircular or reniform, nearly always longer than broad or as long as broad, crenate, laciniate-dentate, or sometimes deeply serrate; sepals markedly reddish-purple; receptacle usually pubescent. (Sierra Madre Oriental, Mexico, to South America.) ..... 54. *R. peruvianus.*

12. Petals narrowly obovate-oblong, 6-8 mm. long, 2-3 mm. broad; pedicels glabrous; basal leaves reniform, broader than long; sepals greenish-yellow. (Southern Mississippi Valley and Baja California, Mexico.) ..... 55. *R. Harveyi.*

4. Petals 1-3.5 mm. long, shorter than or barely equal to the sepals; achenes glabrous.

5. Stems including the pedicels 1 dm. or less long; basal leaf blades 5-9 mm. long, 6-11 mm. broad; achenes about 1 mm. long, obovoid, nearly as "thick" laterally as "broad" dorsoventrally. (Arctic; Rocky Mountains.) (The *Ranunculus nivalis* group.) ..... 40. *R. pygmaeus.*

5. Stems excluding the pedicels 1-5 dm. or more long; basal leaf blades or at least some of them 2-5 or 9 cm. long and 2-6 or 10 cm. broad; achenes 1.3-1.6 mm. long, discoid-obovate, relatively more flattened than in most species of the section. (The *Ranunculus abortivus* group).
   6. Achene beaks 0.6-1 mm. long, curved or recurved; petals 1-1.5 mm. long, one-third or one-half the length of the sepals, broadly elliptic; bracts with 5 nearly linear lobes; roots all filiform; leaves reniform. (New England to North Carolina.) .....56. *R. allegheniensis.*
   6. Achene beaks 0.1-0.3 or rarely 0.4 mm. long; petals one-half or two-thirds or five-sixths the length of the sepals.
      7. Herbage villous; receptacle glabrous (rarely villous); *leaves proximally truncate or almost attenuate;* head of achenes cylindroid or ovoid-cylindroid; achene beak 0.2-0.3 mm. long; bracts of 3-5 linear-oblanceolate divisions; some of the roots filiform and some slightly fusiform-thickened on the same plant. (Middle West and Atlantic Coast.) .....57. *R. micranthus.*
      7. Herbage glabrous or nearly so, sometimes pubescent on the young vegetative parts; receptacle villous or sometimes glabrous; *leaves reniform, usually distinctly cordate at the bases;* head of achenes ovoid; achene beak 0.1-0.2 mm. long; bracts of 3 or 5 narrow divisions, these broadest at the middles; roots filiform, rarely thickened. (Alaska to the Rocky Mountains; Middle West, East; Southeast.) .....58. *R. abortivus.*

2. Roots markedly thickened into storage organs, these large for the relative size of the plant, 1.5-2.5 mm. in diameter.
   3. Stems excluding the pedicels 1.5-4 dm. long, markedly longer than the fruiting pedicels; achenes in ovoid or ovoid-cylindroid heads, the bodies 1.4-2.5 mm. long.
      4. Achenes canescent, about 2.5 mm. long, in an ovoid or cylindroid head 4-10 or 13.5 mm. long; receptacle canescent; leaf bases disintegrating into a conspicuous mass of fibers, the blades usually not present at flowering time. (Mexico.) .....47. *R. arizonicus* var. *chihuahuanus.*
      4. Achenes glabrous, 1.4-1.5 mm. long, in an ovoid or ovoid-cylindroid head 3-5 mm. long; receptacle glabrous or sparsely hirsutulous; leaf bases not disintegrating into a conspicuous mass of fibers, the blades present at flowering and fruiting time. (Southern Mississippi Valley.) .....55. *R. Harveyi* var. *typicus.*
   3. Stems excluding the pedicels 1-4 cm. long, the fruiting pedicels usually exceeding or sometimes equalling the stems; achenes in a globose or ovoid head, the bodies 1-1.3 mm. long.
      4. Petals shorter than or equal in length to the sepals, 2-3.5 mm. long; herbage and receptacle hirsutulous to subglabrous but not glabrous; basal leaf blades 3 lobed and the lobes again shallowly crenately few-lobed; achenes compressed-obovoid, glabrous, the beaks 0.1-3 mm. long; receptacle about 1 mm. long at fruiting time. (Mexico and Guatemala.) (The *Ranunculus Donianus* group.) .....59. *R. Donianus.*
      4. Petals about twice as long as the sepals, 5-10 or 18 mm. long; herbage and receptacle glabrous; basal leaf blades divided into 3-5 oblanceolate entire divisions; achenes plump, very finely pubescent, the beaks 0.25-0.6 mm. long; receptacle 2-6.5 mm. long at fruiting time. (Yellowstone Park to the vicinity of Salt Lake City.) (The *Ranunculus Jovis* group.) .....60. *R. Jovis.*

1. Head of (75-150) achenes globose, 10-20 mm. in diameter; nectary scale usually distally ciliate; herbage glabrous; roots large and fleshy, 2-3 mm. in diameter, the cluster conspicuous and dense; stems prostrate or ascending. (British Columbia and the Western States; North and South Dakota.) (The *Ranunculus glaberrimus* group.) .....61. *R. glaberrimus.*

33 RANUNCULUS NIVALIS L. Sp. Pl. 553. 1753

R. nivalis var. *Freilgrathii* Bessels, Expl. Polar Amer. Bull. Soc. Geogr. VI. 9: 297. 1875, nom. nud., cited by Simmons, Rept. 2nd. Norweg. Arct. Exped. in "Fram" (16): 75. 1909. *R. nivalis* f. *subglobosus* Polunin, Bull. Nat. Mus. Can. (92) pt. 1: 215. *pl. 6. f. (b). upper left.* 1940.

Glabrous or sparsely brown-hirsute terrestrial perennials; roots slender; caudex up to 7 cm. long, 1-2 or 3 mm. in diameter, sometimes branched (often broken off in dried specimens); flowering stems scapose, erect, not rooting, 4-17 or 30 cm. long, 1-2 mm. in diameter, 1-flowered, not fistulous, glabrous or brown-hirsute; basal leaf blades simple, broader than long, often reniform, 1-2 cm. long, 1.3-3 cm. broad, 3-lobed or parted, the middle lobe entire, the lateral lobes again shallowly 2-4-lobed, sometimes crenate, proximally truncate or cordate and distally rounded, glabrous, the petioles 3-10 cm. long, glabrous or brown-hirsute, the stipular leaf bases 2-3 cm. long, membranous; cauline leaves 2-3, alternate, the bracts 3-5-parted, sessile, sometimes sparsely brown-ciliate, the bases expanded; pedicels 1-3.7 cm. long in flower, 7-12.5 cm. long in fruit, glabrous or brown-pilose; sepals dorsally lavender-tinged, spreading, obovate, 6-8 mm. long, 3-5 mm. broad, dorsally densely and conspicuously reddish-brown-hispid, about half or three-fifths the length of the petals, promptly deciduous; petals 5, yellow, obovate, 8-11 mm. long 7-12 mm. broad, the nectary scale glabrous, forming a pocket 0.2-0.3 mm. deep, the margins prolonged 0.4 mm. beyond the pocket; stamens 25-45; achenes usually ascending, but sometimes divergent, about 40-50 in a cylindroid or ovoid-cylindroid head 7-10 or 17 mm. long and 5-6 or 7 mm. in diameter, each achene narrowly flattened-obovoid, 1.5-1.6 mm. long, about 1.2 mm. dorsoventrally, 0.6 mm. laterally, smooth, glabrous, the margin inconspicuous, the beak slender, 1-2 mm. long, not recurved; receptacle cylindroid, about 2 mm. long in flower, 6-9 mm. long in fruit, glabrous or rarely with a few hairs apically.

"In moist moss, moist spots in the heath and moraine, in fellfield" (Porsild, Meddel. Grønl. 58: 78. 1920); mostly near sea level or up to about 2,000 feet elevation near Mt. McKinley, Alaska. Arctic and perhaps Alpine Grassland and Tundra. Circumpolar; northern Alaska and along the shore and islands of the Arctic Ocean to Labrador; Greenland and Iceland. July and August.

A specimen from Capitol Peak, Colorado, (*Penland 1512, CAS*) may be this species. According to Dr. Penland, none of the duplicate specimens have fruit. The glabrous receptacle agrees with *R. nivalis*. The plant shows some resemblance to *R. adoneus*, and it may be that species.

Type collections.—(1) *R. nivalis*, "*Habitat in alpibus* Lapponiae, Helvetiae." The following statement appears in *Rees's Cyclopedia*, volume 29 (pages not numbered: *Ranunculus* under "R"), "Found by Linnaeus in Lapland, by the alpine rivulets on the snowy mountains of that country. Martens had previously gathered it in Spitzbergen." (2) Var. *Freilgrathii*, Hall Land, 81° 15', *Bessels*. According to Simmons, *loc. cit.*, "The name *Freilgrathii*, as far as I know, has never been validly published." (3) f. *subglobosus*, "Type in the British Museum: *Nicholas Polunin*, Wolstenholme, Hudson Strait, No. 233, August 27, 1934."

According to Sørensen, Meddel. om Grønl. 101 (3): 56. 1933, *R. nivalis* flowers earlier than *R. sulphureus* wherever the two species occur together, and *R. nivalis* is well into fruit when *R. sulphureus* begins to flower.

34 RANUNCULUS SULPHUREUS Soland. in Phipps, Voy. N. Pole 202. 1774

R. nivalis L. var. *sulphureus* Wahl. Fl. Lapp. 157. 1812. *R. nivalis* L. var. *sulphureus* DC. Syst. 1: 273. 1818.

Practically glabrous terrestrial perennials; roots slender and numerous on the caudex; flowering stems scapose, erect, not rooting, 3-15 or rarely 24 cm. long, 1.5-4 mm. in diameter, 1-3-flowered, not fistulous, glabrous or sometimes the pedicels brown-hairy; basal leaf blades simple, broadly ovate or usually broader than long, 1.5-2.5 cm. long, 1.5-2.5 cm. broad, crenately 5-9-lobed or sometimes 3-divided, the middle lobe largest, sometimes again 3-lobed, the blades proximally cuneate to truncate and distally rounded, gabrous or sparingly ciliate at the bases, the petioles 2-16 cm. long, usually glabrous, the stipular leaf bases 1.5-3 or 5 cm. long; cauline leaves 1-3, alternate, the bracts 3-parted or -divided, sessile, the bases expanded; pedicels 0.3-5 cm. long in flower, 4-7 cm. long in fruit, sparsely brown-pilose; sepals dorsally tinged with lavender, spreading, obovate, 6-8 mm. long, 3-5 mm. broad, dorsally densely and conspicuously brown-hispid, about two-thirds the length of the petals, persistent until young fruit is formed; petals 5, yellow, obovate, 8-12 mm. long, 6-10 mm. broad, the nectary scale glabrous, forming a pocket 0.3 mm. deep, the margins prolonged for 0.7 mm. beyond the pocket; stamens 20-35; achenes 50-90 in an ovoid-cylindroid or ovoid head 6-7 or 9 mm. long and 5-6 mm. in diameter, each achene flattened-obovoid, 1.8-2 mm. long, about 1.4-1.6 mm. dorsoventrally, 0.6-1 mm. laterally, smooth, usually glabrous or rarely sparsely brown-hispid, the margin inconspicuous, the beak slender, about 0.9-1 mm. long, straight; receptacle cylindroid or narrowly obovoid, 2 mm. long in flower, about 5 mm. long in fruit, brown-pilose.

Habitats similar to those of *R. nivalis;* near sea level; Arctic Grassland and Tundra. Circumpolar; restricted to the far north; Bering Strait, St. Paul Island, and the Aleutian Island and eastward to the Canadian Arctic Archipelago and the islands at the north end of Hudson Bay; Greenland. Late June to early September.

Hulten, Fl. Alaska & Yukon, Lunds Univ. Arrsk. II. 40 (1): 770. 1944, refers "the specimens from the Aleutian Islands and part of those from Pribilof Is. . . . to var. *intercedens* HULT. (Fl. Kamtch. 2, 1928, p. 130 fig 11) characterized by deeply three-lobed basal leaves."

A large and robust type is the following, possibly an undescribed variety: Stems mostly 3-flowered, 12-22 cm. long, 3-5 mm. in diameter; basal leaf blades 3-divided or -lobed, the middle division again 3-lobed to subentire; head of fruits 6-9 mm. long, 5-6 mm. in diameter, achene body narrowly obovoid, 2.4 mm. long, 1.5 mm. broad, sparsely brown-hispid on the upper dorsal portion, the beak 1 mm. long, forming a right triangle with the base, 0.5 mm. broad; the distal exposed portion purple or lavender. Moist ground near sea level; Arctic Grassland and Tundra. St. Paul Island, Pribilof Islands, in the Bering Sea. July and August.

Specimens examined (for the plant discussed in the preceding paragraph).—ALASKA: St. Paul Island, *Macoun*, British Bering Sea Commission, August 3, 1891, *NY*, photograph *Pom-B*, *Can*, August 1, 1896, *Can*, July 23, 1914, *Can*, *Coville & Kearney 1811*, *Can*, *US*.

Type collections.—(1) *R. sulphureus.* The following is quoted from a letter from Dr. H. W. Rickett of the New York Botanical Garden: "No habitat or location given. But on p. 58 he mentions sending a party ashore on Low Island, off the coast of Spitzbergen, and quotes Dr. Irving thus: the ground was 'covered with moss, scurvy grass, sorrel, and a few ranunculuses then in flower.' Since this is the only reference to the vegetation in the text, it is probable that *R. sulphureus* was collected then (July 29)."

35 RANUNCULUS MACAULEYI A. Gray

Nearly glabrous terrestrial perennials; roots slender; stems scapose, erect, not rooting, 8-15 cm. long, 1-2 mm. in diameter, each 1- or occasionally 2-flowered, not fistulous, glabrous except on the pedicels; basal leaf blades simple, narrowly elliptic or elongate or sometimes narrowly obovate or ovate, 1.5-4.5 cm. in length, 0.5-2 or rarely 2-2.8 cm. broad, 3-5-toothed at the apices or occasionally serrate on the distal halves or rarely laciniately or sharply crenately toothed or with two of the sinuses up to 13 mm. deep (the leaf lobed) and the middle lobe 3-toothed or entire, proximally acute and distally acute to somewhat rounded, glabrous or sometimes ciliate, the petioles 2-6 or 10 cm. long, glabrous, the leaf bases broad and membranous, 3-6 cm. long, persistent several seasons and becoming fibrous; cauline leaves alternate or practically opposite, almost always ciliate at least near the bases, the hairs 2-4 or 8 mm. long, the bracts entire or toothed, elliptic or obovate, sessile; pedicels 2-6 cm. long in flower, 5-7 cm. long in fruit, glabrous or brown-pilose; sepals spreading, narrowly obovate, 6-10 mm. long, 2.5-5 mm. broad, the length of the petals, densely and almost always conspicuously dorsally pilose with dark brown hairs about 2 mm. long, deciduous after anthesis; petals 5 or up to 8, yellow, cuneate or cuneate-obovate, 6 or usually 10-14 mm. long, 4 or 6-10 mm. broad, the nectary scale glabrous, forming a pocket, 1 mm. long, truncate; stamens about 30-50; achenes 20-30 in an ovoid or cylindroid head 5-10 mm. long and 4-5.5 mm. in diameter, each achene flattened-obovoid, about 1.7 mm. long, 1.3 mm. dorsoventrally, about 0.5 mm. laterally, smooth, glabrous, the margin inconspicuous, the beak slender, 0.5-0.6 or rarely 1.5-2.2 mm. long, straight or recurved; receptacle elongate-cylindroid, 2-3 mm. long in flower, 4-10 mm. long in fruit, glabrous.

35a RANUNCULUS MACAULEYI var. **typicus,** nom. nov.

R. Macauleyi A. Gray, Proc. Amer. Acad. 15: 45. 1879.

Larger basal leaf blades narrowly elliptic or elongate, or sometimes narrowly obovate, 1.5-4.5 cm. long, 0.5-2 cm. broad, 3-5-toothed at the apices or occasionally serrate on the distal halves; achene beaks 0.5-0.6 mm. long.

Meadows in the mountains at 11,000 to 12,000 feet elevation; Alpine Grassland and Tundra. Rocky Mountain System in southern Colorado from San Miguel and Chaffee counties to Montezuma and Las Animas counties; rare in northern New Mexico. July.

Significant specimens.—NEW MEXICO: Red River head, Franklin, *Berg* in 1897, *NY.* MORA CO. Pecos Baldy, *Standley 4273, NY, RM, Mo, US, Castetter 764* in 1931, *RM, 924* in 1931, *RM.*

Type collection.—"Rocky Mountains in San Juan Co., Lieut. C. H. McCauley, Mr. F. N. Pease." "McCauley collected 2 specimens . . . in the summer of 1877." Cotype, *Macauley* in 1877, *GH*.

35b **Ranunculus Macauleyi** var. **Brandegeei** L. Benson, var. nov.

(Liberal or moderate policy: specific rank)

Basal leaf blades ovate or obovate, the larger ones 2.5-4.5 cm. long, 2-2.8 cm. broad, laciniately or sharply-crenately toothed or with two of the sinuses up to about 13 mm. deep (the leaf lobed) and the middle lobe 3-toothed or entire; achene beaks mostly 1.5-2.2 mm. long.

Foliis ovatis vel obovatis, 2.5-4.5 cm. longis, 2-2.8 mm latis, in partes laceratis; acheniis 1.7 mm. longis, rostro 1.5-2.2 mm. longo.

Elk Mountains and Sangre de Cristo Mountains, Colorado.

This variety bears relationship to *R. adoneus* var. *alpinus*.

Specimens examined.—COLORADO: GUNNISON CO. Elk Mountains above Irwin, *Eastwood* in 1891, *GH* (good flowers with brown-hirsute sepals). SAGUACHE OR CUSTER CO. Source of Lake Creek, Sangre de Cristo Range, *Brandegee 883* in 1874, *PA, Mo*, (type and isotype, cf. below), *884, PA 714892* (topotype with some flowers, *Mo* [recorded as *R. adoneus* var. *alpinus*]; the sepals only sparsely hirsute as sometimes also in var. *typicus*). The following are intermediate plants tending toward var. *typicus*: GUNNISON CO. Irwin ("in the snow"), *Eastwood* in 1891, *GH*. MONTEZUMA CO. La Plata Mountains, *Eastwood* in 1892, *GH*.

Type collection.—Source of Lake Creek, Sangre de Cristo Range, *T. H.* [*T. S.*] *Brandegee 883*, Aug. 1874, Type, *PA 715345*; photograph *Pom-B*; isotype, *Mo 216448* (sepal hairs only slightly brownish).

36 RANUNCULUS ESCHSCHOLTZII Schlect.

Glabrous terrestrial perennials; roots slender; caudex 1-6 cm. long, 3-7 mm. in diameter; stems scapose, erect, not rooting, 4-15 cm. long, 1-2 mm. in diameter, 1-3-flowered, not fistulous; basal leaf blades simple or rarely compound, semicircular to reniform in outline, 1.3-3 cm. long, 2.5-4 cm. broad, 3-cleft to -divided, the middle lobe again 3-lobed or entire, the lateral ones asymmetrically 3-7-lobed to -parted or sometimes -divided, the blades proximally truncate or rounded, the petioes 3-8 cm. long, the stipular leaf bases 1-2.5 cm. long, persistent or soon disintegrating or deciduous; cauline leaves alternate, 1-3, the bracts usually 3-lobed and the lobes entire, sessile; pedicels 0.5-3 cm. long in flower, 3-13 cm. long in fruit, glabrous; sepals 5, yellow, dorsally tinged with lavender, spreading, obovate, 4-8 mm. long, 3-5 mm. broad, glabrous or with sparse, light-colored hair, 50% to 70% the length of the petals, deciduous after anthesis; petals 5, yellow, cuneate-obovate, 5 or 7-12 or rarely 17 mm. long, 5-11 or rarely 19 mm. broad, the nectary scale glabrous, forming a pocket usually 0.3-0.4 mm. deep; stamens usually 20-40; achenes in a cylindroid or ovoid head 7-16 mm. long and 4-7 mm. in diameter, each achene oblong-obovoid, 1.3-1.7 mm. long, 0.9-1 mm. dorsoventrally, 0.8-1 mm. laterally, smooth, glabrous or in one variety often hispidulous, the margin inconspicuous, the beak slender, 0.8-1 mm. long, not recurved; receptacle cylindroid, 1-2 mm. long in flower, 6-15 mm. long in fruit, glabrous or in var. *trisectus* usually puberulent.

TABLE 9.—Varieties of *Ranunculus Eschscholtzii* Schlect.

Var. *typicus*	Var. *Suksdorfii*	Var. *eximius*	Var. *trisectus*	Var. *oxynotus*
Caudex 1-2 cm. long, 3-6 mm. in diameter, usually unbranched.	Caudex 1-1.5 or rarely 2.5 cm. long, 3-5 or 7 mm. in diameter, usually unbranched.	Caudex 1-2 cm. long, 3-7 mm. in diameter, unbranched or branched.	Caudex 1 or 3-6 cm. long, 4-7 mm. in diameter, usually branched.	Caudex 3-7 cm. long, 5-12 mm. in diameter, often branched.
Scarious leaf bases 1-1.5 cm. long, annually deciduous or disintegrating.	Scarious leaf bases 1-2 cm. long, annually deciduous or disintegrating.	Scarious leaf bases 1-2 or 2.5 cm. long, annually deciduous or disintegrating.	Thickened leaf bases 1.5-2.5 cm. long, long-persistent and making the caudex appear thick.	Thickened leaf bases 3-5 cm. long, persistent and making the caudex appear remarkably thick.
Basal leaf blades fairly thin, deeply 3-parted, the middle lobe again 3-lobed or entire, the lateral parted, the *ultimate lobes and sinuses rounded.*	Basal leaf blades thin, *deeply 3-parted, the middle lobe again 3-lobed,* the lateral lobed or sometimes parted or divided, the *ultimate lobes and sinuses sharply acute.*	Basal leaf blades thin, *3-cleft or rarely -parted, the middle lobe entire,* the lateral lobed or cleft, the *ultimate lobes and sinuses sharply acute.*	Basal leaf blades thin, deeply 3-parted, the *middle lobe again 3-7-lobed,* the lateral lobed to parted, the *ultimate lobes and sinuses obtuse or rounded or sometimes acute.*	Basal leaf blades thick, 3-cleft or rarely -parted, the *middle lobe entire* and lingulate or rarely (Tulare Co.) 3-lobed, the lateral *crenate,* the *ultimate lobes and sinuses rounded or obtuse.*
Petals 5 or usually 7-10 mm. long, 5-10 mm. broad.	Petals 7-11 mm. long, 5-10 mm. broad.	Petals 8-12 or sometimes 17 mm. long, 6-11 or 19 mm. broad.	Petals as in var. *Suksdorfii* and var. *typicus.*	Petals as in var. *Suksdorfii* and var. *typicus.*
Achenes and receptacle glabrous.	Achenes and receptacle glabrous.	Achenes and receptacle glabrous.	Achenes and receptacle puberulent or glabrous.	Achenes and receptacle glabrous.
Alaska to California and New Mexico.	Washington to Montana and the edges of Alberta, California, and Wyoming.	Idaho and Montana to Arizona and Utah.	Eastern Oregon; rare in Idaho and Wyoming.	California; rare in Nevada.

KEY TO THE VARIETIES

Ultimate basal leaf lobes and sinuses usually sharply acute, rarely obtuse in var. *eximius.*

Basal leaf blade deeply parted, the middle lobe again 3-lobed .....36B. Var. *Suksdorfii.*

Basal leaf blade cleft, rarely parted, the middle lobe entire .....36C. Var. *eximius.*

Ultimate basal leaf lobes rounded or obtuse, at least not sharply acute.

Caudex 1-2 cm. long, unbranched; scarious or sometimes thickened stipular leaf

bases 1-2 cm. long, deciduous or disintegrating annually; achenes glabrous ....36A. Var. *typicus*.

Caudex 1.5 or 3-7 cm. long, often branched; thickened stipular leaf bases 1.5-3 cm. long, usually persistent for 2 or more seasons.
Middle basal leaf lobe again 3- to 7-lobed; achene pubescent or glabrous; leaves deeply parted and again parted or deeply lobed ....36D. Var. *trisectus*.

Middle basal leaf lobes entire, or very rarely 3-lobed; achene glabrous; leaves usually cleft, rarely parted, the lateral lobes crenate .....36E. Var. *oxynotus*.

36a RANUNCULUS ESCHSCHOLTZII var. typicus, nom. nov.*

R. Eschscholtzii Schlecht. Animad. Ranunc. 2: 16. *pl. 1*. 1820. *R. Eschscholtzii* var. *Hookeri* D. Don in G. Don, Gen. Syst. Gardening 1: 34. 1831, neither *R. Purshii* var. *Hookeri* D. Don in 1831 nor *R. Hookeri* Schlect. in 1834 nor Regel in 1861. *R. nivalis* L. var. *Eschscholtzii* S. Wats. in King, Rept. U. S. Geol. Expl. 40th. Par. 5: 8. 1871. *R. nivalis* L. var. *Eschscholtzii* Lawson, Rev. Can. Ranunc. 84. 1884; Trans. Roy. Soc. Can. 2: 58. 1885. *R. ocreatus* Greene, Pittonia 4: 15. 1899. *R. Helleri* Rydb. Bull. Torrey Club 29: 158. 1902. *R. Eschscholtzii* var. *Helleri* L. Benson, Amer. Jour. Bot. 23: 169. 1936.

Boreal and alpine meadows and talus slopes in the Arctic and Alpine grassland and tundra. The Aleutian Islands and the mainland of Alaska to White Pass in the Yukon, to Crater Lake and scattering stations in California, to the Wallowa Mountains in Eastern Oregon, to the Ruby or East Humboldt Mountains in Nevada, and to Alberta, Utah, and Colorado; Mt. San Francisco, Arizona; Santa Fe Peak, New Mexico. July and August.

The form on the Pacific Slope south of the Canadian boundary has commonly an entire and lingulate middle leaf lobe (previously described as var. *Helleri*). A Utah and Colorado form has the stipular leaf bases often 1.5-2.5 cm. long (*R. ocreatus* Greene.)

Significant specimens.—YUKON: White Pass, *Eastwood 947, CAS, Clo, GH.*

CALIFORNIA: SISKIYOU CO. Marble Valley, *Butler 355, UC; Butler 1714, Pom;* Marble Mountains, *Rowntree* in 1937, *CAS, Holt M1* in 1943, *UC;* Upper Wright Lake, *E. B. Hart 909, UC.* TRINITY CO. Caribou Basin, 6,500 to 7,000 feet, Salmon-Trinity Alps, *J. T. Howell 13439, UPa, CAS, Clo.* EL DORADO CO. Between Lake Lois and Lake Schmidell, Desolation Valley Wilderness Area west of Lake Tahoe, *Robbins 1813, Pom-B.* ALPINE CO. Carson Spur, *Hansen 724, DS, Mo, UC, GH.* TUOLUMNE CO. Emigrant Meadow, *Hoover 5520, Pom-B;* mountain north of Emigrant Lake, *Hoover 5515, Pom-B;* Piute Mountain, *Jepson 4579, J;* Mt. Dana, *Sharsmith 341, UC, Pom-B, 2208, UC, Pom-B, Wash, GH, M. S. Baker 4293b, SRJC;* Mt. Lyell Trail, (this or the next perhaps from the Madera Co. side), *Schreiber 1839, UC, WSC, DS;* Mt. Lyell, *H. M. Hall 3561, UC, Mo.* MADERA CO. Martha Lake, headwaters San Joaquin River, *Ferris & Lorraine 9170, DS.* MONO CO. Near the Harvey Monroe Natural Area. Mt. Conness, *Abrams, Blake, & Keck 2864, DS;* White Mountain, *L. Benson 12770, Pom-B* (duplicates to be distributed). FRESNO CO. Evolution Lake, Mt. Darwin, *Peirson* in 1921, *Peirson 2531.* TULARE CO. East Lake, *J. T. Howell 15936, CAS;* Mineral King, *Brandegee* in 1892, *UC;* Mosquito Lake, Mineral King, *M. S. Baker 4293a, RM, 4293b, SRJC.* INYO CO. Rock Creek Lake Basin. Ruby Lake, *Peirson* in 1933, *Peirson 10783, UC, Peirson* in 1937, *Peirson;* south of South Lake, *Peirson* in 1929, *Peirson 8522,* South Fork of Ruby Creek, *Peirson* in 1933, *Peirson.*

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* Cf. Table 9.

NEVADA: ELKO CO. Ruby (East Humboldt) Mountains, Heller *9393, NY, M. E. Jones* in 1897, *Pom, US, NY, RM, GH, 6141* in 1900, *Pom, Mo, US*, in 1901, *Pom, DS*, in 1902, *Pom;* Clover Mountains (north end of range), *S. Watson* 26 in 1868, *US, GH, NY;* Head of the South Fork of Humboldt River, *Heller 9397, PA, US* (in part); Lamoille Canyon, *Pennell & Schaeffer 23363, PA, Maguire & Holmgren 22140* in 1943, *Utah, GH, 22144, Utah, GH, 22570* in 1943, *Utah, Pom, GH, Wash, 22563, Utah, Holmgren 1421, UC, WSC, Utah;* Liberty Pass, *Munz 16216, Pom.*

NEW MEXICO: Vicinity of Santa Fe Peak, *Arsène & Benedict 16047* in 1926, *US.*

Type collections.—(1) *R. Eschscholtzii*, "Hab. in insulis Unalascha et St. Georgii (de Chamisso)." Isotype, *GH.* (2) Var. *Hookeri*, none given, cf. Hooker, Fl. Bor. Amer. 1: 18. 1829. Perhaps Rocky Mountains. (3) *R. ocreatus*, "Collected by Baker, Earle, & Tracy on Mt. Hesperus, Colorado, 2 July, 1898 (n. 912.)" Type, *HGr 2740* isotypes, *Pom 150731, Pom-B 268468, NY, US 337595.* (4) *R. Helleri*, "IDAHO: near Lake Pend d'Oreille, 1892, *Sandberg, MacDougal, & Heller 842* (type in N. Y. Bot. Gard.)" The type has not been located at the New York Botanical Garden. Isotypes, *UC 9532, CAS 134623, GH* (middle lobe again lobed) (2 sheets, photographs *Pom-B*).

365 RANUNCULUS ESCHSCHOLTZII var. SUKSDORFII (A. Gray) L. Benson,* Amer. Jour. Bot. 23: 170. 1936 (Very liberal policy: *R. Suksdorfii* A. Gray)

R. Suksdorfii A. Gray, Proc. Amer. Acad. 21: 371. 1886.

Mountain meadows and slopes at 5,500 to 6,500 feet elevation; Alpine Grassland and Tundra. Rare in Alberta; Washington in the Olympic and Cascade Mountains; Marble Mountains, Siskiyou County, California; Idaho; western Montana; divide between Teton and Fremont counties northwestern Wyoming. July and August.

Plants from especially southern Idaho and from Wyoming are intermediate between var. *Suksdorfii* and *Ranunculus adoneus* var. *alpinus.*

Significant specimens.—ALBERTA: Upper Yoho Valley, *Sanson 1040, NY;* Spray River, *Sanson 932, NY.*

WASHINGTON AND IDAHO: The variety is known now to be common in the Olympic and Cascade mountains in Washington and in the mountains of Idaho from Shoshone County to Elmore, Blaine, and Custer counties.

CALIFORNIA: SISKIYOU CO. (It is possible that some other specimens from the same region should be interpreted as this variety.) Cold Spring, Woolley Creek, Marble Mountains, *Butler 349* (rather poor collection), *DS, UC;* Black Mountain, Marble Mountains, *J. T. Howell 15161, CAS, USNA;* Marble Mountain, *Butler 1714, Pom* (specimen fragmentary).

MONTANA: GLACIER NATIONAL PARK. Garden Wall, 4 miles north of Logan Pass, *C. L. Hitchcock 1954, Pom;* Logan Pass, *L. Benson 5241, Pom-B;* Avalanche Lake, *M. E. Jones* in 1910, *Pom;* Blackfoot Glacier, *M. E. Jones* in 1909, *Pom.* FLATHEAD CO. Columbian Mountains, *H. T. & J. M. Rogers 1166, Mo.* MINERAL CO. North side of Quarles Peak, *C. B. Wilson 156, Pom, GH.* RAVALLI CO. Darby, *M. E. Jones* in 1909, *Pom* (two collections). DEER LODGE CO. Ryans Lake, *M. E. Jones* in 1905, *Pom.* BEAVERHEAD CO. Black Lion Mountain. *Hitchcock & Muhlick 12989, Pom-B, Wash;* Ajax Lake, *Hitchcock & Muhlick 12675, Pom-B, Wash.* PARK CO. Porcupine Creek, Crazy Mountains, *Blankinship* in 1902, *RM.*

WYOMING: TETON CO. Two-gwo-tee Pass, *L. Williams 939, NY, RM, Mo;* Black Rock Creek, *Tweedy 172, NY.* Possibly this may be var. *eximius* as may be also the last specimen cited above under Montana. The two varieties shade into each other in

* Cf. Table 9.

western Montana. Var. *Suksdorfii* has a continuous range in the higher mountains from Glacier National Park to south-central Idaho.

Type collection.—"Mt. Adams, Washington Terr., at 6,000 to 7,000 feet, in damp ground, *Suksdorf*." July 25, 1884. Type, *GH*, photographs *Pom, Pom-B;* isotypes, *NY, US 1024, UC 193211, PA* (not numbered).

36c RANUNCULUS ESCHSCHOLTZII var. EXIMIUS (Greene) L. Benson,*
Bull. Torrey Club 68: 654. 1941 (Liberal policy: *R. eximius* Greene)

R. eximius Greene, Erythea 3: 19. 1895. *R. saxicola* Rydb. Mem. N. Y. Bot. Gard. 1: 64. 1900

Alpine meadows at 7,000 to 9,500 feet elevation; Alpine Grassland and Tundra. Fremont County, Idaho; western Montana to northwestern Wyoming; Big Horn Mountains and Battle, Carbon County, Wyoming; La Sal Mountains, southeastern Utah, Mt. San Francisco, Arizona. Occurring largely in a zone east of var. *Suksdorfii*. July and early August.

This variety intergrades with *R. adoneus* var. *alpinus*.

Significant specimens.—IDAHO: FREMONT CO. Henry Lake, *E. L. and L. B. Payson 1968, NY, CAS, RM, GH, Mo;* Mt. Jefferson, *Cronquist 1912, ISB.*

UTAH: SAN JUAN CO. Mt. Peale, La Sal Mountains, *Rydberg & Garrett 8786, NY, RM;* Gold Basin (possibly Grand Co.), La Sal Mountains, *Rydberg & Garrett 8837, US, NY.*

ARIZONA: Mt. San Francisco, 10,500 feet, *Whiting & Sanders* cat. no. *756/1060, MNA.*

WYOMING: Common in the northwestern corner of the State. BIG HORN CO. Bald Mountain, *L. & R. Williams 3043, RM, Wash, WSC, GH, Mo;* Little Bald Mountain, *Buffum* in 1892, *HGr, RM*, photograph *Pom-B, Wash, Ill* (lectotype and isotypes of *R. eximius*, cf. below). BIG HORN MOUNTAIN, COUNTY NOT GIVEN. *Tweedy 175, NY, Forwood* in 1881 (or 1887 ?), *GH*. SHERIDAN CO. *Tweedy 2388, NY*. CARBON CO. Battle, *Tweedy 4222, US.*

Type collections.—(1) *R. eximius*, "A most beautiful alpine and subalpine species of the Rocky Mountains in Colorado, Wyoming, and Idaho, apparently somewhat rare, but gathered sparingly, and in poor specimens even by Hall and Harbour, in whose collection it is mixed with *R. adoneus* as far as distributed. Better specimens have been obtained by Mr. Buffum of Laramie." The following specimen has been designated as lectotype (cf. L. Benson, Bull. Torrey Club 68: 654. 1941): Little Bald Mountain, Bighorn Mountains, Bighorn County, *B. C. Buffum* in 1892, *HGr 2592*. Isotypes, *RM* (not numbered), photograph *Pom-B, Wash 7484*, photograph *Pom-B, Ill*, photograph *Pom-B*. (2) *R. saxicola*, "MONTANA: Cedar Mountain, July 16, 1897, *Rydberg & Bessey 4112* and *4113; Mill Creek*, 1887, *Tweedy 192*. YELLOWSTONE PARK: Electric Peak, August 18, 1897, *Rydberg & Bessey 4111;* 1895, *Tweedy, 192;* Mt. Holmes, 1884, *Tweedy, 301*." *No. 4112* of *Rydberg & Bessey* from Cedar Mountain, Montana has been designated as a lectotype (cf. L. Benson, *loc. cit.*). Lectotype, *NY;* isotypes, *Pom-B 268466* and *268467, US 965818* and *360795, GH*, photograph *Pom-B*.

36d RANUNCULUS ESCHSCHOLTZII var. TRISECTUS (Eastw.) L. Benson,*
Amer. Jour. Bot. 23: 170. 1936 (Very liberal policy: *R. trisectus* Eastw.)

R. trisectus Eastw. apud Rob. Proc. Amer. Acad. 45: 394. 1910.

Mountain slopes and meadows at 6,300 to 9,500 feet elevation; Alpine Grassland and Tundra. Wallowa, Powder River, Strawberry, and Steen Moun-

* Cf. Table 9.

tains, Eastern Oregon; Seven Devils Mountains, Idaho; Sublette County, Wyoming. Essentially a plant of Eastern Oregon. Mostly July.

Closely related to *Ranunculus adoneus* var. *alpinus*.

Significant specimens.—OREGON: Common in the Wallowa Mountains and practically the only variety there; collected in the Steen Mountains by a number of botanists. Highest Blue Mountains, *Cusick 1338, NY*. UNION CO. *Cusick 532* in 1877, *GH;* Anthony's Creek, Blue Mountains, *Cusick 1747, DS, WSC, UO;* Blue Mountains above Union, *Cusick 1513, HGr, GH*. GRANT CO. Strawberry (Blue) Mountains, *Cusick 3583, Pom-B, UO, NY, RM, GH, WSC, Wash, Mo*. BAKER CO. Northeast of Lookout Peak, *Maguire & Holmgren 26982* in 1946, *Pom-B*. Powder River Mountains (presumably the range south of Powder River), *Piper 2459, WSC*.

IDAHO: IDAHO CO. Seven Devils Mountains. Hibbs Cow Camp, *Ownbey & Meyer 2091, CAS, Utah, ISB, Wash, WSC* (in part), *GH, Mo;* Lily Pad Lake, *Packard 321* in 1927, *ISB, Wash, WSC, GH, Mo*.

WYOMING: SUBLETTE CO. Vicinity of Green River Lakes, *E. B. & L. B. Payson 4474, RM*.

Type collection.—"Alpine Wallowa Mountains, Eastern Oregon, Altitude 2745 m., growing at the base of cliffs, *William C. Cusick* No. 3200." Type, *GH*, photograph *Pom-B;* isotypes *US 620896, Pom 275510, Wash (J. W. Thompson Herb. 21468)*, photograph *Pom-B, RM 72750*, photograph *Pom-B, UC 146927, DS 43479, Mo* (not numbered).

36e RANUNCULUS ESCHSCHOLTZII var. OXYNOTUS (A. Gray) Jepson,*

Fl. Calif. 1: 537. 1922 (Moderate policy: *R. oxynotus* A. Gray)

R. oxynotus A. Gray, Proc Amer. Acad. 10: 68. 1875.

Mountain meadows and talus slopes at 9,500 to 12,000 feet elevation; Alpine Grassland and Tundra. California in the Warner Mountains, Modoc County; in the Sierra Nevada from Mt. Stanford (Castle Peak) in Sierra County to Tulare County; in the Sweetwater Mountains, Mono County; in the White Mountains, Inyo County; and in the San Bernardino and San Jacinto Mountains; Nevada at Mount Rose in the Sierra Nevada and in the Toiyabe and Shell Creek mountains. Mostly July.

Significant specimens.—CALIFORNIA: MODOC CO. Warren Peak, Warner Mountains, *Applegate 8047, DS, Pom-B;* Eagle Peak, Warner Mountains, *Applegate 8133, UC, DS;* Eagle Peak, *Alexander & Kellogg 5098, Pom*.

NEVADA: WASHOE CO. Mt. Rose, *Heller 9864, DS, GH, PA, S. B. D.* in 1897, *Pom, J. T. Howell 14198, CAS, DS*. NYE CO. Toiyabe Mountains, *Rollins & Chambers 2524, GH*. WHITE PINE CO. South fork of Berry Creek, Shell Creek Mountains, *Pennell & Schaeffer 22964, PA* (in part); Mt. Wheeler, *Maguire 21083, GH*.

Type collection.—"California, near the summit of Castle Peak [Mt. Stanford], Sierra County, at 9,000 feet, J. G. Lemmon." Type, *GH*, photographs, *DS, Pom-B*.

37 RANUNCULUS ADONEUS A. Gray

Glabrous terrestrial perennials; roots slender; caudices 2-4 cm. long, 4-10 mm. in diameter, with often as many as 9 branches in a cluster, closely and densely clothed with dead leaf bases; flowering stems scapose, erect, not rooting, 10-25 cm. long, 2-3 mm. in diameter, 1-3-flowered, perhaps fistulous;

* Cf. Table 9.

basal leaf blades finely divided, semicircular to reniform in outline, 1-2 cm. long, 2-3 cm. broad, deeply parted, the primary divisions again twice-lobed into linear segments, proximally truncate or cordate, distally rounded, the petioles 4-10 cm. long, the stipular leaf bases 2-4 cm. long, persisting one or more seasons; cauline leaves alternate, about 2, the bracts dissected, sessile; pedicels 1-5 cm. long in flower, 3-10 cm. long in fruit, glabrous; sepals 5, dorsally tinged with lavender, spreading, obovate, 6-8 mm. long, 3-5 mm. broad, finely pilose dorsally, about half the length of the petals, promptly deciduous; petals usually 5, yellow, obdeltoid-obovate, when fully expanded 13-18 mm. long, 10-19 mm. broad, the nectary scale glabrous, forming a pocket 0.7 mm. deep, truncate; stamens 100-125; achenes 50-70 in an ovoid head 6-12 mm. long and 5-8 mm. in diameter, each achene oblong-obovoid, 1.8-2 mm. long, 1.3-1.4 mm. dorsoventrally, about 1 mm. laterally, smooth, glabrous or slightly pubescent, the margin inconspicuous, the beak filiform, 1.2-1.7 mm. long, straight, falcate-curving, or often recurved; receptacle ovoid, about 2 mm. long in flower, 7-10 mm. long in fruit, glabrous.

37a RANUNCULUS ADONEUS var. **typicus,** nom. nov.

R. adoneus A. Gray, Proc. Acad. Phila. 15: 56. 1864.

Caudices 3-4 cm. long, 4-10 mm. in diameter, with often as many as 9 branches in a cluster, closely and densely clothed with dead leaf bases; basal leaves finely divided, the ultimate divisions 0.5-1 or 1.3 mm. broad, the stipular leaf bases thickened or scarious, 3-4 cm. long; achene beaks falcate-curving or often recurved.

Moist ground above timber line at 9,500 to 13,000 feet elevation; Alpine Grassland and Tundra. Perhaps occasional in the Wasatch Mountains, Utah; common in Colorado. July and August.

The following collections from Utah at least approach var. *typicus:* Big Cottonwood Canyon, between Silver Lake and Mt. Majestic, *Rydberg & Carleton 6404, NY;* Central Utah &c., *Parry* in 1875, *NY;* Tony Lake, Cache Co., *W. C. & M. W. Muenscher 15509, Wash.* It is probable, however, that they are closer to var. *alpinus.*

Type collection.—"No. 81 of last year's collection by Dr. Parry, who has now supplied the fruit . . . Rocky Mountains in Colorado Territory," 1861. "Dr. Parry's specimens of 1862, collected later in the season, — with some mature fruit, and with some of the stems procumbent and runner-like, and producing a flowering shoot from the axils of the cauline leaves, — enable me to characterize this remarkable species." Cf. introduction of the paper, p. 55, "It should be remarked that the general collection [1862], although made by the three associates [Parry, Hall, and Harbour] cojointly, is distributed under the tickets of Messrs. Hall and Harbour, — upon whom indeed the labor of collection more immediately devolved — and is numbered quite independently of Dr. Parry's collection of 1861, thus avoiding all danger of confusion between the two. But a small separate collection made by Dr. Parry late in the summer, at stations visited by himself alone, which supplements or helps out the general collection, bears Dr. Parry's numbers of the former year . . . or, when of plants not in that collection, the numbers are in continuation of it. . . ." Clearly, this species is based upon a pair of cotypes, as follows: *Parry 81* in 1861 (flowering) and *Parry* in 1862 (fruiting). Cotypes *GH* (same sheet), photograph *Pom-B;* duplicates (apparently the seasons not distinguished as indicated above), *US 1653426* and *1391392*, photograph *Pom-B, PA* (changed to 1864 from 1862), *Mo* (not numbered) (leaf divisions approaching var.

alpinus). The last specimen includes on the label the following additional data; "High alpine region, scattered patches near snowbanks, June." "From the head-waters of CLEAR CREEK," and the alpine ridges lying east of "MIDDLE PARK. . . . C. C. Parry, Coll. 1861."

37b RANUNCULUS ADONEUS var. ALPINUS (S. Wats.) L. Benson, Bull. Torrey Club 68: 655. 1941 (Liberal policy: *R. stenolobus* Rydb.)

R. orthorhynchus Hook. var. *alpinus* S. Wats. Rept. U. S. Geol. Expl. 40th. Par. 5: 9. 1871. *R. stenolobus* Rydb. Bull. Torrey Club 29: 159. 1902.

Caudex 2-3.5 cm. long; flowering stems 15-30 cm. long, more branched than in var. *typicus;* basal leaf blades less finely divided, the ultimate leaf divisions 1-2 mm. broad, the stipular leaf bases more frequently scarious than thickened, 2-3.5 cm. long; petals when fully expanded 8-13 mm. long; achene beaks usually not recurved.

Near snow banks at 9,500 to 11,500 feet elevation; Alpine Grassland and Tundra. Southeastern Idaho from Fremont County to Wasatch and Uintah Mountains, Utah; Bear Lake County and adjacent Wyoming from Teton County to Lincoln and Sublette counties; White Pine County, Nevada; rare in Colorado. July and August.

Numerous Idaho and western Wyoming specimens connect this variety to some degree with *R. Eschscholtzii* var. *Suksdorfii;* it is related also to and connected by intermediates with *R. Eschscholtzii* vars. *eximius* and *trisectus*. Another related type is *R. Macauleyi* var. *Brandegeei*.

Significant specimens.—IDAHO: IDAHO CO. Seven Devils Lake, *Christ 12457, Chr.* (tending toward *R. Eschscholtzii* var. *Suksdorfii*). FREMONT CO. Mt. Jefferson, *Cronquist 1912, Utah.* TETON CO. Teton River, Henry Lake, *Coulter* in 1872, *PA.* BONNEVILLE CO. Caribou Mountain, *Payson & Armstrong 3568, RM, Ill, Mo, GH, Pom, PA.* BEAR LAKE CO. West Fork of Bear River, *E. B. & L. B. Payson 4921, UC.*

NEVADA: WHITE PINE CO. Head of the South Fork of Berry Creek, Shell Creek Mountains, *Pennell & Schaeffer 22964, PA* (in part), *22944, PA;* Lake Theresa below Mt. Wheeler, *Pennell & Schaeffer 23161, PA.*

COLORADO: The following collections approach var. *alpinus*, but any or all may represent merely forms of var. *typicus* approaching var. *alpinus:* Trappers Lake, Garfield Co., *Hermann 5585, PA;* "The Bluffs," Larimer Co., *Goodding 1518, DS, GH, UC, PA, RM, Mo;* Berthoud Pass, *Vasey* in 1868, *Ill, Engelmann* in 1881, *Mo;* Lulu Pass, *Osterhout* in 1894, *Wash;* high alpine summits, *Patterson* in 1876, *Ill, PA;* Cameron Pass, *Osterhout 148, RM, C. F. Baker, 7-14-, Pom;* Leadville, *Trelease* in 1886, *Mo;* Sierra Sangre de Cristo, *Brandegee* in 1874, *UC, Mo, GH.*

Type collections.—(1) Var. *alpinus*, "The large form occurs in low lands in Washington Territory; the variety, in the Wahsatch Mountains, at an altitude of 10,000 feet; July." The type is Wasatch Mountains, Utah, 40th. Parallel, 10,000 (9,000 on some isotypes) feet, *S. Watson* in July, 1869. Type *GH;* isotypes *NY, US 1017*, photograph *Pom-B*. Confused originally with *R. orthorhynchus* probably because of the dissected leaves. (2) *R. stenolobus*, "WYOMING: Headwaters of Cliff Creek, 1900, *C. C. Curtis* (type in herb. N. Y. Bot. Gard.)" Type, *NY;* isotype *Pom-B 268469*.

38 RANUNCULUS VERECUNDUS Rob. apud Piper, Contr. U. S. Nat. Herb. 11: 274. 1906

Glabrous terrestrial perennials; roots mostly 0.5 mm. in diameter, wiry, numerous; caudex branching, 1-2 cm. long, stout, flowering stems subscapose, decumbent, not rooting, 0.8-2 dm. long, 1 or sometimes 1.5 mm. in diameter,

1-5-flowered, sometimes branching near the bases, not fistulous; basal leaf blades simple, cordate or reniform, 7-12 mm. long, 9-18 mm. broad, palmately 3-lobed, the lobes again crenately-lobed, lobes and sinuses obtuse or rounded, proximally cordate and distally rounded, the petioles 1.5-5 cm. long, the stipular leaf bases 1-1.5 cm. long; cauline leaves 1-3, alternate, sessile; pedicels 1-2.5 cm. long in flower, 2-10 cm. long in fruit, glabrous; sepals dorsally tinged with lavender, spreading, elliptic, about 4 mm. long, 1-1.5 mm. broad, pubescent, nearly or fully the length of the petals, promptly deciduous; petals 5, yellow, narowly obovate, 3-5 mm. long, 1.2-1.8 mm. broad, the nectary scale glabrous, forming a pocket 0.1 mm. deep, truncate; stamens 15-30; achenes 25-85 in a cylindroid or ovoid-cylindroid head 4-8 mm. long and 4-6 mm. in diameter, each achene oblong-obovoid, 1-1.5 mm. long, 0.8-1.2 mm. dorsoventrally, 0.5-0.7 mm. laterally, smooth, glabrous, the margin clearly marked but not prominent, the achene beak rather stout, 0.5 mm. long, recurved; receptacle cylindroid or ellipsoid, 0.5 mm. long in flower, 2-6 mm. long in fruit, glabrous.

Wet slopes near timber line from near sea level (northward) to 9,500 feet elevation (southward); Arctic and Alpine grassland and tundra. Rare but widely distributed; Egg Island and Russell Fjord, south-central Alaska; Sawback Mountain, Alberta; Mt. Stuart and Mt. Adams, Washington; Strawberry Mountains, Oregon; Custer and Blaine counties, Idaho; Long Baldy, Little Belt Mountains, and in Glacier National Park, Montana. July and August.

Significant specimens.—ALASKA: Head of Russell Fjord, *Coville & Kearney 940, US, 944, US;* Egg Island, *Coville & Kearney 1041, US.* These specimens are on loan to Dr. Hultén. It is possible that they may be *R. gelidus.* They have not been re-examined since 1931, before the writer had had contact with *R. gelidus.*

ALBERTA: Sawback Mountain, *Sanson 140, NY.*

WASHINGTON: CHELAN CO.: Mt. Stuart, *Elmer 1215* (in part), *NR, J. W. Thompson 7776, Wash, Pom-B, DS, UC, PA, Mo.* PIERCE CO. Mt. Rainier, 7,500 feet, *Flett 2177, Wash, US.* YAKIMA CO. Mt. Aix, Snoqualmie National Forest, *J. W. Thompson 15046, Wash, Pom-B, CAS, DS, Mo;* Mt. Adams, *Suksdorf* in 1883, *GH, NY, UC, DS* (type and isotypes, cf. below), in 1896, *WSC,* in 1903, *WSC,* in 1904, *US, WSC,* in 1906, *Mo, US, WSC.*

OREGON: GRANT CO. Strawberry (Blue) Mountains, *Henderson 5655, UO, DS, GH, CAS, Mo.*

IDAHO: CUSTER CO. Bonanza, *Macbride & Payson 3394, RM, Pom, UC, CAS, DS, GH* (leaf divisions exceedingly broad; stems very long), *Mo, US.* BLAINE CO. Head of Boulder Creek, Sawtooth Mountains, *J. W. Thompson 14100, Wash, Pom-B, US, DS, Mo, CAS.*

MONTANA: GLACIER NATIONAL PARK. Mineral Park, *M. E. Jones* in 1910, *Pom;* Sperry Glacier, *M. E. Jones* in 1909, *Pom;* Sexton Glacier, *Standley 17230, US;* Grinnell Glacier, *G. N. Jones, GH.* MEAGHER CO. Little Belt Mountains, *Scribner 4* in 1883, *PA;* Long Baldy, Little Belt Mountains, *Flodman 469, NY, US.*

Type collections.—(1) *R. verecundus,* "Wet, gravelly places, Mt. Paddo [Adams], alt. 1850-2150 meters, July 31, 1883, *W. N. Suksdorf 93.* (Type in Hb. Gray.)" Type, *GH;* isotypes *NY, UC 135540, DS 43454, WSC 143356.*

39 RANUNCULUS GELIDUS Kar.&Kar. Bull. Soc. Nat. Mosc. Bot. 15: 133. 1842; in Ledeb. Fl. Ross. 1: 733. 1842, not Hoffmansegg ex. Reichenb. Fl. Germ Excurs. 720. 1832, as syn., nom. nud., not Schur. in 1866

R. Hookeri Regel, Reisen Ost-Sib. 1: 47. 1861, not Schlect. in 1834, not *R. Purshii* var. *Hookeri* D. Don in 1831. *R. Grayi* Britt. Bull. Torrey Club 18: 265. 1891. *R.*

Drummondii Greene, Erythea 2: 192. 1894. *R. ramulosus* M. E. Jones, Contr. W. Bot. 14. 47. 1912.

Nearly glabrous terrestrial perennials; roots slender, 0.2-0.3 mm. in diameter; stem a caudex bearing flowering scapes and basal leaves, flowering stems, not rooting, about 5 cm. long, 1 mm. in diameter, about 2-3-flowered, glabrous; basal leaf blades simple, broadly cordate or reniform in outline, 5-7 or commonly 20-25 mm. long, 8-11 or 23-34 mm. broad, 3-parted or -divided and again cleft and lobed, proximally cordate and distally with the lobes rather blunt, glabrous or densely ciliate, the petioles 1.5-6 cm. long, glabrous, the stipular leaf bases about 1 cm. long, ciliate; cauline leaves alternate, sessile or petioled; pedicels 1.5-3.5 cm. long in flower, 2.5-5 cm. long in fruit, curly-pubescent or glabrous; sepals greenish, spreading, nearly circular to elliptic, 2.5-5 mm. long, 2.5 mm. broad, pilose dorsally, half or more the length of the petals, promptly deciduous; petals 5, yellow, obovate, about 5 mm. long, 4 mm. broad, the nectary scale glabrous, forming a pocket, truncate; stamens about 50; achenes 50-80 in a cylindroid to ovoid-cylindroid head 5-9 mm. long and about 5 mm. in diameter, each achene discoid-obovoid, about 2.5 mm. long, 2 mm. dorsoventrally, 0.7-0.9 mm. laterally, smooth, glabrous, the margin inconspicuous, the beak rather stout basally, 0.6-0.7 mm. long, recurved; receptacle cylindroid or obovoid-cylindroid, 1-2 mm. long in flower, 3-8 mm. long in fruit, glabrous or pubescent.

Arctic regions and high mountain peaks southward; up to 13,000 feet elevation; Arctic and Alpine Grassland and Tundra. Mountains of Central Asia; Alaska in the Shumigan Islands and (acc. Hultén) the Alaska Range; near the Arctic Ocean about the mouth of the Mackenzie River; mountains of British Columbia and Alberta; Glacier National Park, Montana; high mountains of Colorado. Summer.

Specimens examined.—ALASKA: Popof Island, Shumigan Islands, *Kincaid* in 1899, *CAS, DS, US.*

MACKENZIE: East slope of the Richardson Mountains, west of Mackenzie River Delta, 4,000 feet elevation, ca. 68°N, 136°W, *A. E. Porsild 6666, Can.*

BRITISH COLUMBIA: Bluster Mountain, Marble Mountains, *J. W. & E. M. Thompson 384, Wash, Pom-B;* Chipuin Mountain, Marble Mountains, *J. W. & E. M. Thompson 579, Wash.*

ALBERTA: Independence Branch of Paborton (?) Creek, Headwaters of Saskatchewan and Athabasca rivers, *S. Brown 1123, Wash;* Jasper National Park, 7,000 feet elevation, *Laing 271* in 1930, *Can.*

MONTANA: GLACIER NATIONAL PARK. Swift Current Pass, *M. E. Jones* in 1910, *Pom* (type of *R. ramulosus*, cf. below).

COLORADO: Lat. 39° to 41°, *Parry* in 1864, *PA;* Ironton, *S. H. Camp* in 1893, *GH.* CLEAR CREEK CO. Gray's Peak, *Letterman* in 1885, *Wash, Patterson* in 1875, *GH,* in 1886, *GH;* Georgetown, probably the Gray's Peak collection, *Patterson* in 1875, *Ill.*

Type collection.—(1) *R. gelidus*, "Hab. in sumnis alpibus Alatau ad fontes fluvii Lepsa, in glareosis ad scaturigines nivibus formatas deliquescentibus. Fl. sub finem Junii." "Enumeratio Plantarum in desertis Songoriae Orientalis et in jugo summarum alpium Alatau anno 1841 collectarum." The following is given by Ledebour *loc. cit.*, "Hab. in sumnis Alatau ad fontes fluvii Lepsa (K [arelin] et K [irelow])." "Enum. Pl. Soongor. Nr. 27." *R. gelidus* Hoffmansegg was cited by Reichenbach as a nomen nudum in synonymy and actually treated as a variety (or possible hybrid with *R. alpes-*

tris) under *R. glacialis* L., although the combination in varietal rank was not made. The following is quoted from Reichenbach, *loc. cit.*, "Tres imprimis formas distinguo: α *R. gelidus* Hffgg. = *alpestris-glacialis* ? . . . β *glacialis genuinus* . . . γ *crithmifolius*. . . ." Apparently *R. gelidus* Hoffmansegg was not validated by publication by other authors between 1832 and 1842, and, not having been validly published, it has no status in priority. The writer is indebted to Mr. C. A. Weatherby for bibliographic data until recently not available on the Pacific Coast. We have not seen the type of *R. gelidus* Kar. & Kir., and application of the epithet to this species is based upon Ostenfeld, Gjöa Exped. 44. 1909. The epithet has been taken up also by A. E. Porsild, Sargentia 4: 38. 1943. (2) *R. Hookeri*, based upon *R. pedatifidus* Hook. Fl. Bor. Amer. 1: 18. *Pl. 8, f. B.* 1829, not J. E. Smith in 1819. "Barren summits of the Rocky Mountains, on the eastern side of the ridge, lat. 52° to 55°. *Drummond.*" (3, 4) *R. Gravi* and *R. Drummondii*, nom. nov. for *R. Hookeri*. (5) *R. ramulosus*, "Swift Current Pass," Glacier National Park, 7,000 feet, *M. E. Jones*, August 11, 1910. Type *Pom 100150*.

R. gelidus is related closely to *R. verecundus* Rob., and it is distinguished most readily by the larger discoid-obovoid achenes, which resemble those of *R. inamoenus*, *R. cardiophyllus*, and *R. pedatifidus*. *R. verecundus*, in turn, is related to *R. Eschscholtzii*. Relationship of *R. gelidus* to the *R. pedatifidus* group is more remote than to the *R. Eschscholtzii* group (particularly to *R. verecundus*), but the species is a connecting link. *R. inamoenus* var. *alpeophilus* is perhaps the closest American relative in the *R. pedatifidus* group, but the relationship is not nearly as close as to *R. verecundus*.

40 RANUNCULUS PYGMAEUS Wahl.

Glabrous terrestrial perennials; roots slender; stems scapose, erect or ascending, not rooting, 1-3 cm. long, 0.5-1.3 mm. in diameter, 1- or 2-flowered, not fistulous; basal leaf blades simple or ternately compound, semicircular, 5-9 mm. long, 6-11 mm. broad, 3-parted or -divided, the middle lobe entire or 3-lobed, the two lateral divisions 2-3-lobed or 2-4-lobed or -cleft, proximally truncate or nearly cordate and distally rounded in outline, the petioles 1-3.5 cm. long, the stipular leaf bases up to 1 cm. long; cauline leaves alternate or practically opposite, the bracts divided, sessile; pedicels 1-7 mm. long in flower, up to 8 cm. long in fruit, glabrous to densely pubescent; sepals greenish-yellow, spreading, elliptic, 2-3.6 mm. long, 1.2-2 mm. broad, apically sparsely hairy, the length of the petals, promptly deciduous; petals 5, yellow, obovate, 1.5-3.5 mm. long, 1-2.8 mm. broad, the nectary scale glabrous, forming a pocket 0.1-0.2 mm. deep, truncate; stamens 10-20; achenes 40-50 in an ovoid, subglobose or cylindroid head 2.5-4 or 7.5 mm. long and 2.5-3 or 4.5 mm. in diameter, each achene obovoid, about 1 mm. long, 0.8 mm. dorsoventrally, 0.5-0.6 mm. laterally, smooth, glabrous, the margin inconspicuous, the beak slender, 0.3-0.7 mm. long, not recurved; receptacle fusiform, about 1 mm. long in flower, 1.5-2 mm. long in fruit, glabrous.

40a RANUNCULUS PYGMAEUS var. **typicus**, nom. nov.

R. pygmaeus Wahl. Fl. Lapp. 157. 1812.

Basal leaf blades simple, 3-parted or -divided, the middle lobe entire, the lateral lobes 2-3-lobed; head of achenes ovoid or subglobose, 2.5-4 mm. long, 2.5-3 mm. in diameter.

Common everywhere "in moist moss, among pebbles at the borders of brooks, in the melting-water from snowfields, in moist places on the heath; very often in outlets from manured places near settlements" (Porsild, Meddel. Grønl. 58: 78. 1920); near the Arctic Ocean and up to about 13,000 feet elevation in the Rocky Mountains; Arctic and Alpine grassland and tundra. Circumpolar; Alaska to the Canadian Arctic Archipelago (apparently not common) and Labrador and southward to the northern Rocky Mountains in British Columbia, Alberta, Montana, Wyoming, and Colorado; Gaspé Peninsula, Quebec; Greenland; Spitzbergen. July to September.

This species is related most closely to *Ranunculus Eschscholtzii* and *Ranunculus verecundus*.

Significant specimens.—BRITISH COLUMBIA: Mt. Selwyn, Rocky Mountains, 56° 1′ N 123° 39′ W, *Raup & Abbe 4121, Can, NY, Raup & Abbe 4050, Can, GH;* Chipuin Mountain, Marble Mountains, *J. W. & E. M. Thompson 579, Pom-B.*

ALBERTA: Cataract Pass, Headwaters of the Saskatchewan and Athabasca rivers, *S. Brown 1445* in 1908, *Wash, NY, GH, Mo;* Lake Louise, *Macoun* in 1891, *Geol. Surv. Can. 64422, Can, NY, GH;* Forget-me-not Mountain, Elbow River, *Macoun* in 1897, *Geol. Surv. Can. 18056, HGr, Can;* Mt. Aylemer, Rocky Mountain National Park, *Macoun* in 1891, *Geol. Surv. Can. 1087, Can.*

QUEBEC (Southern).: Mt. Albert, Gaspé Peninsula, *Collins & Fernald 82, UC 149638, Ill* (in part). This collection was mixed with the type collection of var. *petiolulatus*, cf. below.

MONTANA: GLACIER NATIONAL PARK. Mineral Park, *M. E. Jones* in 1910, *Pom.* BEAVERHEAD CO. Black Lion Mountain, Pioneer Range, *Hitchcock & Muhlick 12899, Pom-B.*

WYOMING: Edges of snowbanks above timberline, *Willits 488* in 1910, *RM;* Ten Sleep Lakes, *Goodding 437* in 1901, *RM.* SUBLETTE CO. Sheep Mountain, vicinity of Green River Lakes, *E. B. & L. B. Payson 4469, RM.* CARBON CO. Medicine Bow Peak, *Leavenworth 265* in 1936, *RM, Wash, G. D. Fuller* in 1936, *Mo.*

COLORADO: Rocky Mountains, *Burke, GH;* Estes Park, 11-12,000 ft., *W. S. Cooper 148* in 1906, *RM;* Summit of Mt. Atchanee, Arapahoe National Forest, *A. & R. Nelson 4546, RM;* Mt. Evans, *Greene* in 1873, *HGr, Mo;* Greenhorn Mountains, *Greene* in 1873, *GH;* Fremont Peak, *C. Richardson* in 1878, *GH.*

Type collection.—Hab. in totius alpini jugi lateribus, locis irrigatis suboccultis juxta rivulos, sub petris et s. p. frequenter. Etiam in Öhrdalen juxta Hopseidet Finmarkiae lectus, sed de caetero nunquam extra alpes alteriores.

40b RANUNCULUS PYGMAEUS var. LANGIANA Nathorst

Öfv. Konigl. Svenska Vet.—Akad. (1): 46. *pl. 1. f. 2-5. 1884*

R. pygmaeus var. *petiolulatus* Fern. Rhodora 19: 137. 1917.

Basal leaf blade deeply divided or compound, the divisions, sometimes short- to long-petiolulate, the middle division again 3-lobed, the lateral divisions 2- to 4-lobed or -cleft and sometimes nearly as large as the usual leaves; head of fruits cylindroid, 5-7.5 mm. long, 3-4.5 mm. in diameter.

Damp, mossy hollows at near sea level northward or at about 3,000 to 3,300 feet elevation southward. Arctic and (rarely) Alpine grassland and tundra. Both coasts of Greenland; Mt. Albert, Gaspé County, Quebec; Sperry Glacier, Montana. August.

Specimens examined.—GREENLAND. WEST COAST: Nathorst's excellent photographs.

EAST COAST: "Cape" Hooker, Jamesen Land, 70° 35′ N, 23° 30′ W. *Sørensen* in 1933, *GH*. Several other collections from Greenland have been reported in the literature.

QUEBEC: Gaspé Co. Mt. Albert, *Collins & Fernald 82* in 1905, *GH, Pom-B, Ill* (in part), *NY*, (type, and isotype sof var. *petiolulatus*, cf. below) (*UC 149638* is *R. pygmaeus*).

MONTANA: GLACIER NATIONAL PARK. Sperry Glacier, *M. E. Jones* in 1909, *Pom* (plant about like the Gaspé County collection).

Type collection.—(1) Var. *Langiana*, "Nordvestra Grönland." "4. **Wajattel.** 69° 45′-70° 15′." (2) Var. *petiolulatus*, "QUEBEC: damp mossy hollows in shade of amphibolite rocks, altitude 950-1000 m., Mt. Albert, Gaspé County, August 8 & 10, 1905, *Collins & Fernald*, no. 82 in large part (TYPE in Gray Herb.). . . . On Mt. Albert collections were made on two days at different points and all the material distributed under one number. The full sheet retained at the Gray Herbarium contains a few plants of true *R. pygmaeus*, but most of the specimens (presumably from a different station) are the variety." The petiolules of these plants are much shorter than in Nathorst's collections, which are far more extreme. Alliance of these two forms may be unholy, and more data are needed. Inclusion of the Montana and Quebec collections and recognition of the variety at all are only tentative pending additional evidence. Type, *GH*, isotypes, *Pom-B 268470, Ill* (in part), *NY*, *Can*, photograph *Pom-B*.

41 RANUNCULUS SABINEI R. Br. Bot. App. Parry's 1st Voy. 264. 1824

R. pygmaeus Wahl. f. *Sabinei* F. Kurtz in Engl. Bot. Jarb. 19: 452. 1894. *R. pygmaeus* Wahl. var. *Sabinei* Davis, Minn. Bot. Studies 2: 489. 1900.

Nearly glabrous terrestrial perennials; roots rather wiry, less than 1 mm. in diameter; stems erect, not rooting, 6-12 cm. long, 1-2.5 mm. in diameter, simple or branching, 1-6-flowered, glabrous or sparsely long-pilose; basal leaf blades simple, cuneate in outline, 1-3 cm. long, 1-3.4 cm. broad, *3-lobed or the 2 lateral lobes again 2-lobed or rarely with additional* slight lobing, proximally cuneate and the lobes distally rather obtuse, gabrous or sparsely pilose, the petioles 2.5-5 cm. long, glabrous or sparsely pilose, the stipular leaf bases conspicuous, 1.5-2 cm. long; cauline leaves alternate, consisting of about 3 nearly linear divisions, sessile; pedicels 1-2.5 mm. long in flower, 2-4 cm. long in fruit, pilose; sepals yellowish, markedly tinged with purple, spreading, narrowly oblong-obovate, 4-7 mm. long, 2-3 mm. broad, markedly pilose dorsally, four-fifths to fully the length of the petals, tardily deciduous; petals 5, yellow, obovate to neary oblong, 5-8 mm. long, 3-4 mm. broad, the nectary scale glabrous, forming a pocket, truncate; stamens probably 10-20; achenes about 50-80 in a cylindroid head 6-9 mm. long and about 4 mm. in diameter, mature achenes not seen, the younger ones flattened-obovoid, the beaks slender, 0.5 mm. long, markedly recurved; receptacle cylindroid, 1-2 mm. long in flower, 5-8 mm. long in fruit, sparsely long-pilose.

Moist ground in arctic regions; Artic Grassland and Tundra; according to Simmons, Vasc. Pl. Ellesmereland 113. 1906, "*R. Sabinei* prefers the fields of stiff clay. . . ." Cape Bathurst, District of Mackenzie, to Ellesmere Land, Labrador, and northwestern Greenland. July and August.

Hultén, Fl. Alaska & Yukon, Lunds Univ. Arrsk. II. 40 (1): 766. 1944, contends that *R. Sabinei* is a variety of *R. pygmaeus*, as follows: "In the above material specimens from Pt. Barrow and Ooglamie differ in being very large-grown and robust. They must be said to belong to var. *Sabinei* (R. BR.) KURTZ, characterized by larger size, thick, long peduncles [pedicels] and

large flowers with very hairy sepals and constituting an extreme arctic race of *R. pygmaeus*. They are intermediate between the most extreme var. *Sabinei* and typical *R. pygmaeus*. The specimens from King I. are also high-grown but represent a form still closer to *R. pygmaeus*." The writer has not seen intermediate plants. Varietal status is not indicated by the results of this study.

Type collection.—"Collected in Melville Island, By the Officers of the Expedition." "Chiefly in the vicinity of Winter Harbour. . . ." ". . . in Herb. *D. Sabine* extat."

42 RANUNCULUS ALLENII Rob. Rhodora 7: 220. 1905

Sparsely hirsute terrestrial perennials; roots almost filiform; stems subscapose, erect or reclining, not rooting, 8-18 cm. long, 1-1.5 mm. in diameter, 1-3-flowered, not fistulous, sparsely hirsute; basal leaf blades simple, *reniform or semi-circular, 1.5-3 cm. long, 1.5-2 cm. broad, shallowly crenately toothed or lobed, sometimes but not usually some of the leaves 3-parted*, proximally cordate or truncate, distally rounded, glabrous, the petioles 3-6 cm. long, ciliate or glabrous, the stipular leaf bases 1-1.5 cm. long; cauline leaves alternate, the bracts deeply parted or divided, sessile; pedicels 1-2 cm. long in flower, 4-8.5 cm. long in fruit, sparsely pilose; sepals greenish, apparently not lavender-tinged, spreading, obovate, 4-5 mm. long, 2.5-3 mm. broad, sparsely pilose dorsally, at least three-fourths the length of the petals, promptly deciduous; petals 5, yellow, obovate, 4-5 mm. long, 3.5-4 mm. broad, the nectary scale glabrous, forming an obovate pocket 0.2-0.3 mm. long; stamens 25-40; achenes 20-45 in an ovoid head 4-6.5 mm. long and 4-6.5 mm. in diameter, each achene flattened-obovoid, 1.5 mm. long, 1.2 mm. dorsoventrally, 0.6-0.7 mm. laterally, smooth, glabrous, the margin inconspicuous, the beak slender, 0.5-0.7 mm. long, recurved; receptacle fusiform-cylindroid, 2-3 mm. long in flower, 3 or 4-5 mm. long in fruit, hispid.

Meadows at 2,500 to 4,000 feet elevation or at lower elevations northward; Arctic Grassland and Tundra. James Bay and the east coast of Hudson Bay to southern Baffin Land and Labrador; Gaspé County, Quebec. July and August.

Significant specimens.—QUEBEC: DISTRICT OF FRANKLIN. Brewster Point, Frobischer Bay, Baffin Land, *Wynne-Edwards 7397, Can;* Yorke Island, Frobischer Bay, *Wynne-Edwards 7313, Can;* North Twin Island, James Bay, *Macoun* in 1887, *Can; NY;* Long Island, Hudson Bay, *Dutilly & LePage 12780, Pom-B, Dutilly & LePage 14196, Pom-B;* Mt. Albert, Shickshock Mountains, Gaspé Co., *Collins & Fernald 83* in 1905, *GH, NY, US, Pom, Pom-B, CAS, UC, Ill* (type and isotypes, cf. below), *Macoun* in 1882, *NY, Can;* Mt. MacNab, Tabletop Mountains, Gaspé Co., *Fernald, Dodge, & Smith 25759, NY, CAS, UC, Mo, PA, Can, US;* Tabletop Mountain, *Porter* in 1883, *Can.*

Type collection.—"GASPÉ COUNTY, QUEBEC: on flood plain of an alpine brook, north face of Mt. Albert, alt. 770 to 1100 m., 14 August, 1905, *J. F. Collins & M. L. Fernald* no. 83. (type in herb. Gray.)" Type, *GH;* isotypes, *NY, US 493704* and *1591385, Pom 128906, Pom-B 268465, CAS 145403, UC 149637* and *370796, Ill.*

43 RANUNCULUS INAMOENUS Greene

Hirsute or glabrous terrestrial perennials; roots slender; stems erect, not rooting, 10-30 cm. long, 1.5-3 mm. in diameter, each with 3-7 or rarely 11 flowers, fistulous, hirsute; basal leaf blades simple and ovate, obovate, or orbi-

cular, 1-4 cm. long, 1-3.5 cm. broad, crenate, 3-lobed or -divided, proximally more or less attenuate to rounded or subcordate and distally rounded, glabrous or appressed-pubescent, the petioles 4-10 cm. long, appressed-pubescent or glabrous, the stipular leaf bases 1.5-2.5 or rarely 3 or 4 cm. long; cauline leaves alternate, the bracts of 3-5 nearly linear lobes, sessile; pedicels 3-10 or 33 mm. long in flower, 10-50 or 80 mm. long in fruit, appressed-pubescent or glabrous; sepals 5, greenish-yellow, spreading or turned downward, narrowly obovate, 3-5 or 7 mm. long, about 2-2.5 or 4.5 mm. broad, pilose, half as long as the petals or equalling them, deciduous after anthesis; petals 5, yellow, narrowly elliptic to obovate, 2.5-8 mm. long, 2-4 mm. broad, the nectary scale glabrous, forming a pocket, truncate; stamens about 30-50; achenes 50 or 60-100 in a cylindroid or barrel-shaped head 6 or 7-17 mm. long and 5 or 6-8 mm. in diameter, each achene discoid-obovoid, about 1.5 or rarely 2-2.3 mm. long, 1.3 or rarely 1.5-1.7 mm. dorsoventrally, 0.5-0.6 mm. laterally, smooth, densely short-pubescent or glabrous, the margin usually inconspicuous, the beak slender, 0.8-0.9 or 1.5-2 mm. long, recurved or straight; receptacle slender, cylindroid, 2-3 mm. long in flower, 6-15 mm. long in fruit, hispidulous or glabrous.

43a RANUNCULUS INAMOENUS var. **typicus,** nom. nov.

R. affinis R. Br. var. *apetalus* D. Don in G. Don, Gen. Syst. Gardening 1: 35. 1831. *R. affinis* var. *subintegrifolius* D. Don, *loc. cit. R. affinis* var. *micropetalus* Greene, Pittonia 2: 110. 1890. *R. inamoenus* Greene, Pittonia 3: 9. 1896. *R. micropetalus* Rydb. Bull. Torrey Club 29: 158. 1902.

Hirsute or subglabrous; basal leaf blades (at least some on each plant) crenate, rarely some 3-lobed or divided, proximally more or less attenuate; stipular leaf bases 1.5-2.5 or rarely 4 cm. long; pedicels 3-10 mm. long in flower, 10-50 or rarely 70 mm. long in fruit, appressed-pubescent; sepals narrowly obovate, 3-5 mm. long, about 2-2.5 mm. broad; petals narrowly elliptic to obovate, 2.5-8 mm. long, 2-4 mm. broad; achenes 60-100 in a cylindroid or barrel-shaped head 7-17 mm. long and 6-8 mm. in diameter, each achene discoid-obovoid, about 1.5 mm. long, 1.3 mm. dorsoventrally, densely canescent, the margin inconspicuous, the beak slender, 0.8-0.9 mm. long, recurved; receptacle hispidulous.

Moist ground in the mountains at 6,500 to 9,500 feet elevation; Rocky Mountain Forests. Rocky Mountain System from British Columbia and Alberta to the Kaibab Plateau, Mt. San Francisco, and the Sierra Ancha, Arizona, and to the Sacramento Mountains, New Mexico; in Idaho collected only from Custer County to Fremont County. Mostly June and July.

An extreme form with large fruit (2 mm. long) occurs in Colorado, e. g. Eldora to Baltimore, Gilpin County, *Tweedy 5588, NY;* Berthoud Pass, 11,000 feet, *Tweedy 5689, NY* (achene beaks nearly straight); Cuchara River above La Veta, 2,100 meters, *Rydberg & Vreeland 6244, NY.*

Significant specimens.—BRITISH COLUMBIA: Fraser River Valley, *Macoun* in 1875, *GH;* Sheep Mountain, Elk River Valley, *Weber 2338, WSC, GH.*

ALBERTA: Maligne Lake, Jasper Nat. Park, *Scamman 2635, GH, S. Brown 1161, Mo, Can, PA;* Brazeau Lake, *S. Brown 1063, NY, GH, Mo, PA;* Base of Mt. Wilson, North fork of North Branch of Saskatchewan River, *S. Brown 998, GH, PA, NY, Wash, Mo;* Banff, *Macoun* in 1891, *Can, McCalla 2119, Wash, Sanson 1076,*

NY; Pipestone Creek, Laggan, Rocky Mountain Nat. Park, *Macoun* in 1904, *Geol. Surv. Can. 64417, GH, Can, 64418, NY, Can, Canby* in 1895, *GH;* Pipestone Valley, *S. Brown 438* in 1906, *GH, PA, Can;* 40-60 miles southwest of Banff, *P. P. Clark* in 1905, *GH;* Jumping Pound Creek, *Macoun* in 1897, *Geol. Surv. Can. 18039, HGr, Can;* Elbow River, *Macoun* in 1897, *Geol. Surv. Can. 18037, HGr, GH, Can;* Bragg Creek, Elbow River, *Macoun* in 1897, *Geol. Surv. Can. 18038, HGr, GH, Can;* Bob Creek, Porcupine Hills, *Cram* in 1920, *Can;* West of the Gap, Crows Nest Pass, *Macoun* in 1897, *Geol. Surv. Can. 18042, Can;* Crows Nest Pass, *Brinkman 3106, NY;* Waterton Lake, *McCalla 6567, Pom-B.*

WASHINGTON: STEVENS CO. Near Ft. Colville, *Lyall* in 1861, *GH;* 8 miles northeast of Colville, *Spiegelberg 17* in 1923, *GH.* PEND OREILLE CO. Newport, *Sprague 190* in 1923, *WSC;* 2 miles north of Newport, *Spiegelberg 18* in 1923, *GH.*

IDAHO: CUSTER CO. Marsh Creek, 25 miles west of Stanley, *Cronquist 2831, Utah, ISB, GH;* Stanley, *Cronquist 331, Mo* (only a few hairs on the achenes); Cape Horn, *Macbride & Payson 3621, NY, Pom, CAS, DS, RM, GH;* Bonanza, *Macbride & Payson 3471, Pom, NY, UC, CAS, DS, RM, GH;* Mill Creek 12 miles west of Challis, *Cronquist 2950, ISB, Utah, GH.* CLARK CO. Frazier Dam, *R. J. Davis 352* in 1938, *ISB.* FREMONT CO. Rea, *Maguire 17121, Utah.*

ARIZONA: MOHAVE CO. Mokiak Springs, *Gould 1810, Pom-B.* COCONINO CO. DeMotte Park, Kaibab Forest, *Mead* in 1929, *GCNP, Pom-B;* Kanabowitz Spring, North Rim Grand Canyon, *Collom* in 1939, *GCNP;* Road to Cape Royal, North Rim Grand Canyon, *Peirson* in 1927, *Peirson 7408;* Mt. San Francisco, *Greene* in 1889, *HGr, NY,* photograph *Pom-B* (type and isotype of var. *micropetalus*, cf. below), *Knowlton 163½, HGr, Kearney & Peebles 12155, Sac;* Potato Lake, southern Coconino County, *Deaver 2044, Pom.* APACHE CO. Luckaichuka Mountains, *Shreve 8988, UC, UA-Shr.* GILA CO. Murphy Ranch, Sierra Ancha, *Harrison 7851, Sac.*

Type collection.—(1) Var. *apetalus*, "Hook. fl. bor. amer. p. 13. t. 6. f. A. b." "β. γ. Melville Island, (*Parry*), and shores of the Arctic Sea, between long. 107° and 159°. *Dr. Richardson. Captain Sir J. Franklin. Captain Back. Drummond* . . . in the var. β. the whole plant is often pubescent or even hoary." Var. β. or γ represented on Franklin Exped. sheet, *GH*, photograph *Pom-B.* (2) Var. *subintegrifolius*, "Native of Melville Island and shores of the Arctic sea. (Hook.)" Based upon *R. affinis* R. Br. var. γ Hook. Fl. Bor. Amer. 1: 13. 1829. A subglabrous form. Cf. data for β and γ above. A probable isotype at the Gray Herbarium has pubescent achenes and is not var. *alpeophilus* as might be suspected, photograph *Pom-B.* (3) Var. *micropetalus*, "*R. arizonicus*, var. *subaffinis Greene*," Pittonia 2: 60. 1890, "not of Gray," Proc. Amer. Acad. 21: 370. 1886. "On the San Francisco Mountain (which some recent explorers and visitors effect to call Mt. Agassiz) it grows along cold subalpine brooklets where it is associated with *Mertensia Siberica, Primula Parryi*, etc." Greene's collection from Mt. San Francisco in 1889 has been designated a lectotype, cf. L. Benson, Bull. Torrey Club 68: 650. 1941. Lectotype, *HGr 1198* and *2498;* isotype, *NY*, photograph *Pom-B.* The petals of the type specimen are 4-5 mm. long. The short-petalled and small-fruited form, which includes practically every specimen from Utah, Arizona, and New Mexico, most of those from the northern Rocky Mountains, and many from Colorado could be recognized as a variety based upon *R. affinis* var. *micropetalus.* However,, so much intergradation is found in both characters, that it seems better to consider *R. inamoenus* as variable in size of flowers and fruits, even though commonly small petals and small fruit accompany one another, and the two characters are found together through a large but indefinite geographical range. (4) *R. inamoenus*, "Common in the whole Rocky Mountain Region, at middle elevations, and hitherto erroneously treated as a variety of the arctic R. affinis." The fact that in 1890 Greene considered the central and northern Rocky Mountain plant somewhat different from his variety *micropetalus* on Mt. San Francisco, Arizona, is shown by the following statement, Pittonia 2: 110. 1890, "It [var. *micropetalus*] differs from the Colorado and northern *R. affinis* only in its much more slender habit, minute flowers, and long cylindrical head of achenes" Since there is no recorded change of opinion between 1890 and 1896, it may be assumed that the variety *micropetalus* was not considered as the "variety of the arctic

R. affinis" mentioned by Greene in 1896 and that the species *inamoenus* was based upon a different type. This viewpoint was taken by Rydberg, Fl. Colo. 145. 1906. Coulter, Man. Rocky Mt. Bot. 8. 1885, recognized two varieties of *R. affinis* for the Rocky Mountains. One was based upon *R. cardiophyllus* Hook. (*R. affinis* var. *cardiophyllus* A. Gray, Proc. Acad. Phila. 15: 56. 1864, which has now a later typonym, *R. affinis* var. *validus* A. Gray, Proc. Amer. Acad. 21: 371. 1886.) Since the variety *cardiophyllus* of Coulter's Manual is described as having "*flowers an inch in diameter*," it could not have been the type of *R. inamoenus* with the whole "corolla 3-5 lines broad." The other variety was identified by Coulter as *R. affinis* var. *leiocarpus* Trautv. and described as having small flowers, and it is possible that Greene had this variety in mind when he described *R. inamoenus*, although the proof is not necessarily adequate, and he may have referred to var. β or γ of Hooker. Since Greene gave no type and only a vague reference to a variety of *R. affinis*, it was necessary to establish the identity of the species *R. inamoenus* by reference to the Herbarium Greeneanum, which contains 15 or 20 specimens. The following were collected by Dr. Greene prior to publication of the species Nov. 9, 1896: Upper Bear Creek, Colorado, *Greene* in 1889; Dale Creek, Wyoming, *Greene*, June 30, 1896. The Dale Creek specimen, *HGr 2639* and *2648*, has been designated a lectotype, cf. L. Benson, Bull. Torrey Club 68: 651. 1941.

43b RANUNCULUS INAMOENUS var. ALEOPHILUS (A. Nels.) L. Benson

Bull. Torrey Club 68: 651. 1941

(Liberal policy: *R. alpeophilus* A. Nels.)

R. alpeophilus A. Nels. Bull. Torrey Club 26: 350. 1899. *R. utahensis* Rydb. Bull. Torrey Club 29: 158. 1902.

Herbage practically glabrous; basal leaf blades 3-parted or some of them 3-lobed, proximally more rounded to subcordate; achenes and usually the receptacle glabrous; otherwise similar to var. *typicus*.

Moist slopes in the mountains at mostly 8,000 to 9,500 feet elevation; Rocky Mountain Subalpine Forest. Yoho Valley, British Columbia; Pend Oreille County, Washington; Bonneville County, Idaho; Beaverhead County, Montana; Wyoming and the Ruby (East Humboldt) Mountains in Nevada to Mt. San Francisco, Arizona, central and southeastern Utah, and southwestern and central Colorado. Summer.

Specimens examined.—BRITISH COLUMBIA: Yoho Valley, Rocky Mountains, the record of the specimen lost, probably *NY*.

WASHINGTON: PEND OREILLE CO. Newport, *Sprague 190, WSC*.

IDAHO: BONNEVILLE CO. Caribou Mountain, *Payson & Armstrong 3513, RM, Pom, Ill, GH, Mo, PA*.

NEVADA: ELKO CO. Ruby (East Humboldt) Mountains, 9,900 feet, *Heller 9397 US* (in part, but not *NY* or *PA*).

UTAH: *L. H. Ward 132* in 1875, *Powell Exped., US;* Mt. Barrette, *Rydberg & Carlton 7197, RM, NY;* Stillwater Basin, *Maguire, Richards, & Maguire 4118, UC;* Uintah Mountains, county not given, *Porter* in 1873, *PA*. CACHE CO. Sage Parks, Lower Tony Grove Canyon, Mt. Naomi Region, *Maguire, Hobson, & Maguire 13955* in 1936, *Utah*. SALT LAKE CO. Alta, Wasatch Mountains, *M. E. Jones 1130, NY, Pom, Utah* (type and isotypes of *R. utahensis*, cf. below), *M. E. Jones* in 1893, *Pom*. SUMMIT CO. East Fork of Bear River, Uintah Mountains, *Goodman 470* in 1928, *RM;* Dyer Mine, Uintah Mountains, (Summit Co.?) *Goodding 1247, RM, Pom, GH, Mo*. WASATCH CO. Horse Creek southwest of Strawberry Reservoir, *Graham 9237, Pom-B, GH, Mo*. SAN PETE CO. Head of George's Fork east of Manti, *Coville & Tidestrom 48* in 1908, *US;* Middle Forks Park, Skyline Drive, Wasatch Plateau, Manti National Forest, *Maguire 20038* in 1940, *WSC, Utah*. PIUTE CO. Tate Mine,

Marysvale, *M. E. Jones 5863a* in 1894, *US*, *5940a* in 1894, *US*. GRAND CO. Trail to Burro Pass, La Sal Mountains, *Maguire & Maguire 20396* in 1933, *Utah*; Gold Hill, La Sal Mountains, *Maguire 20383* in 1933, *Utah*, *GH*, *20385* in 1933, *Utah*, *RM*; Brumley Creek, La Sal Mountains, (perhaps San Juan Co.), *Rydberg & Garrett 8870*, *NY*.

ARIZONA: COCONINO CO. Mt. San Francisco, *Little 4713*, *Pom-B*, (approached by some plants of) *L. Benson 9628*, *Pom-B*, *UA* (cf. var. *subaffinis* below).

MONTANA: BEAVERHEAD CO. 15 miles west of Wisdom on the Gibbons Pass Road, *Hitchcock & Muhlick 9190*, *GH*.

WYOMING: YELLOWSTONE NATIONAL PARK. Yellowstone Lake, *Scheuber* in 1900, *NY*. TETON CO. Teton Pass east of Victor, Idaho, *E. B. & L. B. Payson 2151*, *NY*, *CAS*, *RM*. LINCOLN CO. Mt. Wagner, southeast of Smoot, *Payson & Armstrong 3750*, *Ill* (in part), *Mo*, *PA* (in part). SUBLETTE CO. Wyoming Range, 15 miles west of Merna, *E. B. & L. B. Payson 2774*, *RM*. CARBON OR ALBANY CO. Medicine Bow Range, 9,500 feet, *Kemp* in 1902, *NY*; Brooklyn Lake, Medicine Bow Mountains, *J. M. & M. T. Greenman 6166*, *GH*, *Mo*; University of Wyoming Summer Camp, Medicine Bow Mountains, *Rollins 924*, *GH*, *Mo*, *WSC*, *Ownbey 154*, *WSC*. ALBANY CO. Telephone Mines, *A. Nelson 7880*, *Pom*, *GH* (in part). Cf., also the Wyoming type collections listed below, the two cotypes of *R. alpeophilus* having been collected at the La Plata Mines.

COLORADO: Rocky Mountains, perhaps Colorado, *Sheldon* in 1899, *PA*; Lat. 40°-41°, *Vasey* in 1868, *GH*; *Mt.* Rosalie, *Zobel* in 1935, *CAS*; Farnham, *E. C. Smith* in 1891, *Wash*, *Mo*; Corona, B. R. G. in 1916, *Ill*. ROUTT CO. West of Rabbit Ears Pass, *L. Benson 4816*, *Pom-B*, *4817*, *Pom-B*, *4818*, *Pom-B*, *UC*, *US*; Anita Peak, *Coodding 1764*, *UC*, *RM*, *GH*. JACKSON CO. East of Rabbit Ears Pass, *Pennell & Schaeffer 22404*, *PA*; Rabbit Ear Range, *Goodding 1574*, *UC*, *GH*, *Mo*. GRAND CO. Lulu Pass, *Clokey 3275M*, *Clo*; Berthoud Pass, *Tweedy 5686*, *RM*. BOULDER CO. Jenny (or Dixie) Lake, *H. M. Hall 10470*, *UC*. CLEAR CREEK CO. Gray's Peak, *Patterson* in 1885, *US*. GARFIELD CO. Trappers Lake, *Hanna 1446*, *Mo*. PITKIN CO. Independence Pass, *Hitchcock, Rethke, & Raadshoven 4002*, *DS*. GUNNISON CO. Virginia Basin, *Osborn 2461*, *Pom-B*, Virginia Peak, *Osborn 2448*, *Pom-B*. CHAFFEE CO. South Cottonwood Gulch, ... *338* in 1892, *Mo*. MONTEZUMA CO. Mt. Hesperus, *Baker, Earle, & Tracy 298* in 1898, *NY*, *RM*, *US*.

Type collections.—(1) "Several collections of it have been secured, from nearly alpine stations in the State [Wyoming], growing in moist, rich soil. Nos. 1780 [*RM 4924*, photograph *Pom-B*] and 4211 by the writer, and no. 5252 [*RM 15423*, photograph *Pom-B*; dupl. *NY*, *GH*, *Mo*.] by Mr. Elias Nelson may be cited as typical." The type is established by the following excerpts from a letter received from Dr. Aven Nelson and dated December 21, 1938: "Replying to your valued inquiry concerning *Ranunculus alpeophilus*, I will state that my number which I have designated as type and which I find in our type case is 4211, Battle Lake Mountain, August 17, 1897, collected by myself." This specimen should be considered as a lectotype, cf. L. Benson, Bull. Torrey Club 68: 651. 1941. Lectotype, *RM 10442*, photograph *Pom-B*. (2) *R. utahensis*. "UTAH: Alta, Wasatch Mts., 1879, *M. E. Jones*, *1130*. (Type in herb. Columbia University.)" Type *NY*; isotypes *Pom 100507*, *Utah 6354*. This is a form with thick leaves and robust stems.

43c RANUNCULUS INAMOENUS var. SUBAFFINIS (A. Gray) L. Benson
Amer. Jour. Bot. 27: 187. 1940

(Liberal policy: *R. subaffinis* (A. Gray) Rydb.)

R. arizonicus Lemmon var. *subaffinis* A. Gray, Proc. Amer. Acad. 21: 370. 1886. *R. subsagittatus* (A. Gray) Greene var. *subaffinis* Greene, Pittonia 2: 110. 1890. *R. subaffinis* Rydb. Bull. Torrey Club. 24: 246. 1897.

Stipular leaf bases 2.5-3 cm. long; pedicels 10-33 mm. long in flower, 60-80 mm. long in fruit; sepals obovate, 5-7 mm. long, 3.5-4.5 mm. broad; petals

mostly obovate or obovate-lanceolate, 6-9 mm. long, 2.5-7 mm. broad; achenes about 50-60 in an ovoid or cylindroid head 6-11 mm. long and 5-7 mm. in diameter, each achene about 2-2.3 mm. long, 1.5-1.7 mm. dorsoventrally, the beak about 1.5-2 mm. long, straight (or bent or curved out of position in herbarium specimens) the margin a little more conspicuous than in var. *typicus* or some achenes showing evidence of very broad margins.

Moist ground near timberline at about 10,000 to 12,000 feet elevation; Alpine Grassland and Tundra and Rocky Mountain Subalpine Forest. Mt. San Francisco, Arizona. June and July.

The achene beaks are reminiscent of *R. adoneus* var. *alpinus* and *R. Macauleyi* var. *Brandegeei*.

Specimens examined.—ARIZONA: Mt. San Francisco, *Greene* in 1889, *HGr, Knowlton 110* in 1889, *US; MacDougal* in 1891, *GH, Wooton* in 1892, *US, Hanson A604* in 1923, *RM, Mo, Little 4697, Pom-B, Sac;* San Francisco Peaks, (margin of the crater), 10,400 feet, *L. Benson 9628, Pom-B, UA;* San Francisco Peaks, *Whiting & Sanders* in 1935, *UA;* Near Flagstaff, *P. L.* in 1928, *UA;* Mt. Agassiz, 11,000 ft., *Lemmon* in 1884, *UC;* east slope of San Francisco Mountains, *Mearns* in 1887, *NY;* Upper Smith Creek, 3200 m., *Leiberg 5756, US.*

Type collection.—"Mt. Agassiz, [San Francisco Peaks,] *Lemmon*," collected near the summit at 12,000 feet elevation, September, 1884. Type, *GH*, photograph *Pom-B;* isotype, *UC 118260.*

44 RANUNCULUS RHOMBOIDEUS Goldie, Edinb. Jour. 6: 329. 1822

(?) *R. ovalis* Raf. in Desv. Jour. Bot. 4: 268. 1814, nom. nud. *R. brevicaulis* Hook. Fl. Bor. Amer. 1: 13. 1829. *R. ovatifolius* Pursh ex Steudl. Nom. ed. 2. 434. 1841, as syn.

Pilose-hirsute terrestrial perennials; roots 1 mm. in diameter; stems erect, not rooting, 1-2 dm. long, 1-2.5 mm. in diameter, somewhat branched, 3-12-flowered, fistulous, rather densely hirsute; basal leaf blades simple, oblong-ovate, ovate, or occasionally some of them obovate, 1.5-5 cm. long, 1-4 cm. broad, crenately toothed, proximally acute or obtuse, distally rounded or truncate, markedly hirsute (especially dorsally) to nearly glabrous, the petioles 4-8 cm. long, pilose, the stipular leaf bases 2-3 cm. long; cauline leaves alternate, the bracts of 3-5 linear divisions, sessile; pedicels 1-5.5 cm. long in flower, 3-8.5 cm. long fruit, sparsely to densely pilose; sepals 5, yellowish, dorsally tinged with lavender, spreading, narrowly obovate, 5-6 mm. long, 3 mm. broad, pilose, two-thirds the length of the petals, deciduous after anthesis; petals 5, yellow, spatulate-obovate, 7-8 mm. long, 4 mm. broad, the nectary scale glabrous, oblong, forming a pocket, truncate; stamens 25-50; achenes 30-50 in a globose or spheroidal head 5-6 mm. in diameter, each achene flattened-obovoid but with a broad stipe, 2 mm. long, 1.5 mm. dorsoventrally, 0.5-0.6 mm. laterally, smooth, glabrous, the margin inconspicuous, the style 0.3 mm. long, the beak slender, 0.3 mm. long, curved or recurved; receptacle globose or spheroidal, 1-2 mm. in diameter in flower, 3 mm. in diameter in fruit, covered with long hairs.

Prairie. Northeastern British Columbia to Ontario and Montreal, Quebec, and southward from the Dakotas to central Nebraska, Missouri (?), and Illinois; "New York" and South Hadley, Massachusetts.

Significant specimens.—BRITISH COLUMBIA: Hudson Hope, Peace River Valley, 56° 2′ N, 121° 55′ W, *Raup & Abbe 3674, GH, Can;* Dawson Creek, ca. 55° 46′ N, 120° 15′ W, alt. 2,000 feet, *Raup & Abbe 3508, GH, Can;* Tupper Creek, *Cowan* in May, 1938 (with Raup's number), *GH*, in June, 1938 (with Raup's number), *GH*.

QUEBEC: "Near Montreal (*Dr. Holmes*)," acc. Macoun, Cat. Can. Pl. 1: 17. 1883.

NEBRASKA: THOMAS CO. Halsey, Pool & ..... (name poorly spoken into Ediphone) in 1912, *Mo*.

MISSOURI (?): Ft. Gratiot, *Thenor* (?), *Schweinitz Herb., PA*.

NEW YORK: Torr. & Gray Fl., *GH*.

MASSACHUSETTS: South Hadley, ... (name not decipherable) in 1887, *US 275316*.

RHODE ISLAND: Woonsocket, *Lawrence*, May 5, 1898, *WSC*. (However, there is a Woonsocket, South Dakota.)

Type collections.—(1) *R. ovalis*, "Canada." Many authors have attributed this name to *R. rhomboideus*, but there is little evidence that it was applied to that species, cf Fern. Rhodora 38: 175-7. 1936. (2) *R. rhomboideus*, "In dry sandy fields, near Lake Simcoe, Upper Canada [Ontario]." Collected by Goldie in Ontario County. (3) *R. brevicaulis*, "Shores of Lake Huron. *Dr. Richardson. Drummond.*" Collections at the Gray Herbarium include the following: "Flor. Bor. Amer." from Herb. J. Gay; N. W. Amer., Franklin Exped., Dr. Hr. [Hooker], 2 specimens labelled *R. brevicaulis* (probably one from Boston Natural History Society and one not). Some of these may be from the type collection. (4) *R. ovalifolius*, syn. for *R. rhomboideus*.

45 RANUNCULUS FORRERI Greene

Glabrous to tomentose terrestrial perennials, the hairs when present long, soft, and appressed; roots slender, fibrous, about 1-1.5 mm. in diameter, distributed along the lower part of the caudex; flowering stems scapose or moderately leafy, suberect, not rooting, 2-4 dm. long, 1.5-3 mm. in diameter, branching above, 5-10-flowered, basal leaf blades simple, lanceolate, oblanceolate, or narrowly oblong, 2-11 cm. long, 0.4-2.3 cm. broad, apically 3- or sometimes 5-7-toothed, the toothing deep or in one variety shallow, rarely a few of the leaves entire, the apical tooth with a large crater-like gland, the petioles 3-7 cm. long, the stipular leaf bases about 1.5-2 cm. long, silky or glabrous; cauline leaves alternate, few, lanceolate, apically toothed or lobed, the smaller bracts often entire but sometimes 3-divided; pedicels 2-5 cm. long in flower, 5-8 cm. long in fruit; sepals yellow-green, spreading, elliptic, 4-8 mm. long, 2-6 mm. broad, thinly to densely silky, half or two-thirds the length of the petals, promptly deciduous; petals 5 or rarely 6, obovate or narrowly so, 6-10 mm. long, 3-7 mm. broad, the nectary forming a complete pocket or the apex sometimes free for a short distance, ciliate or glabrous; stamens about 20-35; achenes 10-25, in an ovoid or subglobose head 4-8 mm. long and 4-7 mm. in diameter, each achene biconvex, turgid, 2 mm. long, 1.5-2 mm. dorsoventrally, 1.3 mm. laterally, smooth, markedly inconspicuous, the beak about 1 mm. long, straight or curving; receptacle cylindroid or somewhat swollen, 1-2 mm. long in flower, 3-4 mm. long in fruit, hirsute.

The species (particularly the variety *madrensis*) is transitional between the sections *Epirotes* and *Flammula*, and it may be classified as well in one as the other. The nearest relatives are species such as *R. Gentryanus*, *R. peruvia-*

nus, and *R. arizonicus* distinctly in the section Epirotes, but there is a close approach to the *R. hydrocharoides* complex as well.

45a RANUNCULUS FORRERI var. **typicus**, nom. nov.

R. Forreri Greene, Pittonia 1: 154. 1888. *R. pentadontus* Standl. Field Mus. Publ. Bot. 12: 247. 1937.

Thinly or sometimes densely appressed-hairy, sometimes densely tomentose-pilose, always densely hairy on the stipular leaf bases; basal leaves lanceolate or narrowly oblong, 7-11 cm. long, 1-2.3 cm. broad, apically 3- or sometimes 5-7- or very rarely 9-toothed or -lobed or occasionally some of the leaves entire.

Mostly in pine woods and upland prairies at 6,000 to 8,500 feet elevation. Mexico in the Sierra Madre Occidental in Chihuahua and Durango.

Specimens examined.—CHIHUAHUA: Sixty miles south of Guadalupe y Calvo, *E. W. Nelson 4794, NY, US;* San Juanito, Dept. Bocoyna, *Shreve 8032, UA-Shr, US, GH, Mich;* Memelichi, Rio Mayo, *Gentry 2787, F, GH, UA-Shr, DS, UC, US, Mo* (type and isotypes of *R. pentadontus*, cf. below).

DURANGO: Garcia *404, US;* West of Durango, *Forrer 20* in 1881, *HGr, UC*, photograph *Pom-B* (type and isotype of *R. Forreri*, cf. below); El Salto, *E. W. Nelson 4562, US, GH, Pom-B, Pennell 18556, PA, Pom-B;* Cruz de Piedra, *Pennell 18261, US;* between El Salto and Cueva, *Pennell 18472, US, PA;* El Salto, *Pennell 18556, US;* Quebrada Honda, *Palmer 220* in 1906, *GH, F, NY, US* (This collection being densely tomentose-pilose but apparently with no other consistent distinguishing character).

Type collections.—(1) *R. Forreri*, "Mr. A. Forrer, in the autumn [Sept. or Oct.] of 1881, on the higher Sierra Madre back of the city of Durango, Mexico, the locality having an altitude of about 8,100 ft." Type, *HGr 2600;* isotype, *UC 170268*, photograph *Pom-B*. The specimen in the herbarium of the University of California is numbered *20*. (2) *R. pentadontus*, "Memelichi, Rio Mayo, Chihuahua, on gentle forest slope, pine woods, 2,250 meters, September 17, 1936, *Howard Scott Gentry 2787* (type in Herb. Field Mus.)." Type *F 863580*, photograph *Pom-B;* isotypes *GH*, photograph *Pom-B, UA-Shr, DS, UC 582008, US 1689744, Mo 1163662.*

45b **Ranunculus Forreri** var. **madrensis** (Rose) L. Benson, comb. nov.
(Liberal policy: *R. madrensis* Rose)

R. madrensis Rose, Contr. U. S. Nat. Herb. 5: 199. *pl. 5.* 1899.

Plants glabrous or practically so except for the pedicels and sepals; basal leaves oblanceolate to lanceolate, 2-6.5 cm. long, 0.4-0.7 cm. broad, subserrately shallowly toothed; bracts consisting of 3 linear divisions; flowers somewhat smaller than in var. *typicus*, the petals about 6 mm. long.

Moist places in the mountains, at 6,000 to 8,000 feet elevation. Mexico in the Sierra Madre Occidental in Durango, Zacatecas and Nyarit (Tepic).

Specimens examined.—DURANGO: Metates north of Cueva, *Pennell 18381, PA, US.*

ZACATECAS: Sierra Madre, *Rose 2375, US 301288*, photograph *Pom-B, GH.*

NYARIT (TEPIC): Between Santa Gertrudis and Santa Teresa, *Rose 2102, US, GH* (type and isotype, cf. below).

Type collection.—"Collected by J. N. Rose on the top of the Sierra Madre between Santa Gertrudis and Santa Teresa, Territorio de Tepic, altitude about 2,000 meters. August 8, 1897 (No. 2102); and in the State of Zacatecas, altitude 2,615 meters. August 18, 1897 (No. 2375)." *Rose 2102, US 301003*, photograph *Pom-B*, is designated as a lectotype; isotypes *US 1391370, GH*.

46 **Ranunculus Gentryanus** L. Benson, sp. nov.

Pilose-tomentose terrestrial perennials; roots from the caudex, fibrous, slender, 1 mm. in diameter; stems suberect or reclining, not rooting, 1-2 dm. long, 1-1.5 mm. in diameter, 3-7-flowered, not fistulous, thinly tomentose with long hairs; basal leaf blades simple, obovate or broadly ovate, 2-4 cm. long, 1.8-3.2 cm. broad, shallowly crenate-serrately or somewhat laciniately shallowly lobed often only above, thin, proximally and distally rounded, palmately several-veined, with long appressed hairs on both surfaces, the petioles 3-7 cm. long, slender, tomentose with long hairs, the stipular leaf bases densely covered with long hairs; large cauline leaves none, the bracts of 3-5 linear-lanceolate divisions, sessile; pedicels 2-3 cm. long in flower, 2-5 cm. long in fruit, appressed-pubescent; sepals spreading, elliptic, 4 mm. long, 2-3 mm. broad, with a few long hairs, half the length of the petals, early deciduous; petals 5, cuneate-obovate, 6-8 mm. long, 3.5-5 mm. broad, the nectary scale forming a complete pocket, glabrous; stamens 12-20; achenes 5-10 in a subglobose head about 4 mm. in diameter, each achene biconvex, 2 mm. long, 2 mm. dorsoventrally, 1 mm. laterally, smooth, densely canescent, the margin thin and fairly prominent, the beak slender, 1-1.3 mm. long, straight; receptacle ovoid-cylindroid, 1 mm. long in flower, 1-2 mm. in fruit, sparingly hispidulous.

Herba perennis terrestris pilosa-tomentosa; radicibus fibrosis, tenuibus, 1 mm. diametro; caulibus scaposis, non e nodis radicantibus, 1-2 dm. longis, 1-1.5 mm. diametro, 3-7-floris, non fistulosis, pilosis; foliis obovatis vel ovatis, 2-4 cm. longis, 1.8-3.2 cm. latis, crenatis-dentatis vel laciniatis, pilosis; sepalis non reflexis, 4 mm. longis, 2-3 mm. latis, pilosis, circiter dimidio quam petalis brevioribus; petalis 5, cuneatis-obovatis, 6-8 mm. longis, 3.5-5 mm. latis, squamulis nectariis latere non liberis, glabris; carpellorum capitulo subgloboso, 4 mm. diametro; acheniis 5-10, 2 mm. diametro, laevis, canescentibus, rostro non curvato, 1-1.3 mm. longo; receptaculo ovoide-cylindroide, 1-2 mm. longo, hispidulo.

Known from only the type collection. Mt. Mohinora, southwestern Chihuahua, *E. W. Nelson 4888*, Sept. 1, 1898. Type in the Gray Herbarium, photograph *Pom-B;* isotype *US 332933*, photograph *Pom-B*. Named for Dr. Howard Scott Gentry, author of a book entitled *Rio Mayo Plants*, based upon the flora of a portion of southwestern Chihuahua and adjacent Sonora, and an energetic collector of the plants of the region.

The description and discussion above apply to only **R. Gentryanus** var. **typicus** nom. nov. The following plant is either a variety of *R. Gentryanus* or a new species. Since it is similar in many points to *R. Gentryanus*, it is considered as a variety of that species. Securing of additional data may confirm or refute this supposed close relationship.

Ranunculus Gentryanus var. **Palmeri** L. Benson, var. nov.

Differing from var. *typicus* as follows: Plant densely pilose-tomentose; roots rather stout, 1.5-2 mm. in diameter; stems about 2 mm. in diameter; basal leaves elongate-ovate or nearly ovate-lanceolate, mostly 4-5 cm. long, 1.5-2.7 mm. broad, strongly serrate, thick, proximally rounded and distally more or less acute, with dense appressed hairs beneath, glabrous above, the petioles 3-7.5 cm. long; large cauline leaves few or none, deeply parted or divided; flowers small, the petals oblanceolate, 1-2 mm. broad; fruit unknown, the young carpels very finely canescent along the ventral margins or densely canescent all over.

Herba pilosa-tomentosa; radicibus 1.5-2 mm. diametro; caulibus circa 2 mm. diametro; foliis subovatis-lanceolatis vel subovatis, 4-5 cm. longis, 1.5-2.7 cm. latis, serratis, dorso tomentoso; petalis oblanceolatis, 1-2 mm. latis; acheniis ignotis; carpelis canescentis.

Quebrada Honda, Durango, Mexico. Known from only the type collection.

Type collection.—Quebrada Honda, Durango, Mexico, *Palmer 211*, May 20 & 21, 1906, Type, *US 571233*, photograph *Pom-B;* isotypes *GH*, photograph *Pom-B*, *NY*, photograph *Pom-B*.

47 RANUNCULUS ARIZONICUS Lemmon

Sparsely pilose or hirsute terrestrial perennials; roots very numerous, about 1-2 mm. in diameter or rarely tuberous and up to 3 mm. in diameter; stems scapose, erect, not rooting, 1.5-3 dm. long, about 2 mm. in diameter, simple below, 4- or mostly 8-12-flowered, somewhat fistulous, glabrous or tomentose about the nodes; basal leaf blades rarely seen in pressed specimens, usually withering before flowering time, simple, broadly cordate-ovate, reniform, or orbicular, or a few of them obovate-cuneate or cuneate, 2-5.5 cm. long, 2.5-6.5 cm. broad, the larger ones 3-parted or -cleft, the middle lobe and often the lateral lobes again 3-5-cleft or -parted into linear divisions, the smaller leaves crenate, leaves proximally cordate and distally rounded, very sparsely hirsute on especially the margins, petioles 10-15 cm. long, glabrous to tomentose, stipular leaf bases 1-1.5 cm. long, sometimes pinnatifid, sessile, producing a remarkable quantity of brown fibers after disintegrating; pedicels 1.3-7 cm. long in flower, 4-8 cm. long in fruit, usually glabrous; sepals 5, yellowish, spreading, broadly obovate, 3 mm. long, 3 mm. broad, glabrous, less than half the length of the petals, deciduous early in anthesis; petals 5 or rarely 6-11, yellow, oblanceolate-obovate, 7-15 mm. long, mostly 3-5 mm. broad (or perhaps sometimes broader), the nectary scale distally ciliate or rarely glabrous, forming a pocket, free on the distal third or half, truncate, the adjacent petal surface commonly pubescent; stamens 20-35; achenes 15-50 in an ovoid or cylindroid head 4-10 or rarely 13.5 mm. long and 4-5 mm. in diameter, each achene obovate, 2.5 mm. long, 2 mm. dorsoventrally, about 0.6 mm. laterally, smooth, finely and densely canescent, the margin inconspicuous, the beak slender, about 1 mm. long, straight; receptacle cylindroid, slender, 1-2 mm. long in flower, 3-6 or 11 mm. long in fruit, canescent.

47a RANUNCULUS ARIZONICUS var. **typicus**, nom. nov.

R. arizonicus Lemmon apud A. Gray, Proc. Amer. Acad. 21: 370. 1886. *R. nudatus* Greene, Leafl. Bot. Obs. & Crit. 1: 211. 1906. *R. palmifolius* Standl. Field Mus. Publ. 17: 246. 1937.

Roots very numerous, about 1-2 mm. in diameter, elongate, not tuberous; nectary scale distally ciliate, possibly very rarely glabrous, the adjacent surface of the petal pubescent, the scale sometimes also pubescent above.

Relatively dry situations at 5,000 to 8,000 feet elevation; Pine forests (?) and the southwestern Oak Woodland. Southeastern Arizona on Mt. San Francisco and in Greenlee, Santa Cruz and Cochise counties; southwestern New Mexico in Grant County; Sonora to Chihuahua and Durango, Mexico.

Specimens examined.—ARIZONA: COCONINO CO. Mt. San Francisco (possibly though the San Francisco Mountains in Greenlee County), *Greene* in 1889, *HGr*. *Knowlton 62* in 1889, *HGr*. GREENLEE CO. 30 miles north of Clifton, *Kearney & Peebles 12228*, *Sac*, *GH*. SANTA CRUZ CO. Patagonia Mountains, *Peebles, Harrison, & Kearney 5607*, *Sac*. COCHISE CO. Huachuca Mountains, *Lemmon 2626* in 1882, *GH*, *PA*, *HGr*, *2815*, *Porter* in 1882, *NY*, *Wilcox* in 1892, *NY*; Carr Canyon, Huachuca Mountains, *Goodding 193* in 1909, *NY*, *UA*, *Pom-B RM*, *GH*; Bear Creek, Huachuca Mountains, *Goodding 281* in 1909, *NY*, *RM*, *GH*; San Simon Valley, *Toumey* in 1894, *UA*, *UC*; Rucker Valley, Chiricahua Mountains, *Lemmon 585* in 1881, *GH*, *UC* (type and isotype of *R. arizonicus*, cf. below); Rucker Canyon, 3 miles below Ft. Rucker, *W. Stone 590* in 1919, *PA*; Chiricahua Mountains, *W. W. Price* in 1894, *DS*, *Blumer*, *UA*.

NEW MEXICO: GRANT CO. Copper Mines (Santa Rita), *Bigelow 13*, *NY*, *Wright 837* in 1851, *NY*, *UC*, *GH*, *US*, *PA*, *Thurber 231* in 1851, *GH*; *Burro Mountains*, 7,500 feet, *Metcalfe 198* in 1903, *HGr*, *Pom*, *Pom-B*, *DS*, *GH*, *Mo*, *US* (type and isotypes of *R. nudatus*, cf. below).

MEXICO. SONORA: Cerro Saguarivo, San Bernardo, *Pennell 19639*, *US*, *PA* (a slender type, possibly a variety).

CHIHUAHUA: Madera, *Palmer 300* in 1908, *F*, *US*, *NY*, *GH*, *Mo* (type and isotypes of *R. palmifolius*, cf. below), *439* in 1908 *US*; west of Hop Valley, *M. E. Jones* in 1903, *Pom* (good basal leaves), UC; Minaca, Dept. de Guerrero, *Shreve 8007*, *US*, *F*, *UA-Shr*; Sierra Madre, *E. W. Nelson 6022*, *US*; La Junta, *Pennell 18753*, *US*, *PA*.

DURANGO: Otinapa, *Palmer 389* in 1906, (pedicels tomentose) *US* (head of achenes up to 13.5 mm. long), *F*, *UC*, *Mo*, *NY*, *GH*.

Type collections.—(1) *R. arizonicus*, "Lemmon, in herb. Gray. . . . The plant sent by Mr. Lemmon with this name is the same as C. Wright's no. 837, also from Arizona [from New Mexico], and which was taken for a form of *R. affinis* in the Botany of the Mexican Boundary." The Lemmon collection is the type. It was collected in Rucker Valley, Chiricahua Mountains, Sept. 28, 1881, *Lemmon 585*. Type, *GH*, photograph *Pom-B*; isotype *UC 118259*. (2) *R. nudatus*, "Burro Mountains, O. B. Metcalfe, 20 June, 1903." Type, *HGr 13977*; isotypes, *Pom 99838*, *Pom-B 271173*, *DS 97487*, *GH*, photograph *Pom-B*, *Mo* (not numbered), *US 495306* and *735603*, *UA*. (3) *R. palmifolius*, "Mexico: Vicinity of Madera, Chihuahua, May-June, 1908, *Edward Palmer 300* (type in Herb. Field Mus.)." Type, *F 237890*, photograph *Pom-B*; isotypes, *US 573766*, *NY*, *GH*, *Mo 212014*.

47b **Ranunculus arizonicus** var. **chihuahuanus** L. Benson, var. nov.

(Liberal policy: specific rank)

Roots few, about 3 mm. in diameter, fusiform-tuberous; nectary scale and petal glabrous.

Radicibus fusiformibus tuberosis, 3 mm. diametro; squamulis nectariis glabris. Headwaters of the Rio Mayo, Chihuahua, Mexico.

Type collection.—Near Mesa de Correo, Harde *LeSueur 626*, July 2, 1936. Type in the Gray Herbarium, photograph *Pom-B;* isotypes *Tex, F 858573, CAS 319585.*

48 RANUNCULUS CARDIOPHYLLUS Hook

Pilose terrestrial perennials; roots about 1-2 mm. in diameter; stems erect, not rooting, 2-4 dm. long, 2-4 mm. in diameter, branching from near the bases or scapose, 1-5-, or 8-flowered, fistulous, pilose or glabrous, striate; basal leaf blades simple, cordate, 1-6 cm. long, 1-5 cm. broad, crenate, the apex sometimes lobed or rarely parted, proximally cordate and distally rounded, pilose, the petioles 5-10 or 18 cm. long, pilose or glabrous, the stipular leaf bases 1-4 cm. long, not markedly fibrous after withering; cauline leaves alternate, the bracts divided into 3-7 linear lobes, sessile; pedicels 5-12 cm. long in flower, 6-17 cm. long in fruit, densely pilose above, sepals 5, greenish-yellow, petaloid at the apices, spreading, obovate, deeply concave, 6-10 mm. long, 4-7 mm. broad, densely pilose dorsally, half to nearly the length of the petals, deciduous soon after anthesis; petals 5, yellow, broadly cuneate-obovate, obovate, obovate-deltoid, or oblanceolate-obovate, 5 or 8-15 mm. long, 4 or 6-13 mm. broad, the nectary scale ciliate on the apical margin, the hairs nearly 1 mm. long (the surrounding petal surface often with similar hairs), forming a pocket, obdeltoid or oblong; stamens 35-80; achenes 20-125 in a cylindroid head 5-15 mm. long and 4-6 or usually 7-9 mm. in diameter, each achene obovate, 2 mm. long, 1.5 mm. dorsoventrally, 0.6-0.8 mm. laterally, smooth, finely canescent, the margin inconspicuous, the beak slender, 0.6-1 mm. long, recurved or straight; receptacle ovoid-cylindroid, 1-4 mm. long in flower, 4-14 mm. long in fruit, densely hairy.

48a RANUNCULUS CARDIOPHYLLUS var. **typicus,** nom. nov.

R. cardiophyllus Hook. Fl. Bor. Amer. 1: 14. *pl. 5. f. B.* 1829. *R. affinis* R. Br. var. *cardiophyllus* A. Gray, Proc. Acad. Phila. 15: 56. 1864. *R. affinis* R. Br. var. *lasiocarpus* Torr. Bot. Wilkes Exped. 17: 213. 1874. *R. affinis* var. *validus* A. Gray, Proc. Amer. Acad. 21: 371. 1886. *R. cardiophyllus* var. *pinetorum* Greene, Pittonia 4: 144. 1900. *R. pedatifidus* J. E. Smith var. *pinetorum* Davis, Minn. Bot. Studies 2: 483. 1900. *R. affinis lasiococcus* Torr. ex Piper, Contr. U. S. Nat. Herb. 11: 273. 1906, as syn., apparently a mistake for *lasiocarpus.*

Stems 2-4 mm. in diameter, branching from near the bases, 1-5- or 8-flowered, fistulous, pilose and often densely so; basal leaf blades cordate, 1-6 cm. long, 1-5 cm. broad, the apices sometimes lobed or rarely parted, proximally cordate, distally rounded, pilose, the petioles 5-10 or 16 cm. long, pilose, the stipular leaf bases 1-4 cm. long; cauline leaves few but well-developed, the bracts of 3-7 linear divisions; petals broadly cuneate-obovate, 8-15 mm. long, 6-13 mm. broad, the nectary scales obdeltoid; achenes 50-125 in a cylindroid head 8-10 or usually 10-15 mm. long and 5-6 or usually 7-9 mm. in diameter, the achene beak recurved; receptacle ovoid-cylindroid, 3-4 mm. long in flower, 7-14 mm. long in fruit.

Meadows in the mountains at 2,000 to 5,000 feet elevation northward or

7,500 to 10,000 feet southward; Rocky Mountain Forests. British Columbia and Moose Mountain, Northwest Territory; Rocky Mountain System in Alberta and hills of Saskatchewan; reported from northern Washington; from Wyoming and the Black Hills of South Dakota to Northern Arizona and the northern edge of New Mexico. Mostly July.

Apetalous forms have been found in Wyoming.

Significant specimens.—MACKENZIE: Moose Mountain, *Macoun 25* in 1880, *US*. BRITISH COLUMBIA: Dawson Creek, *Raup & Abbe 3507, NY, Can;* Cassiar Trail, 9 miles west of Dease Lake, Lat. 58° 30' N., *Dawson* in 1887, *Can*. SASKATCHEWAN: Sucker Creek, Cypress Hills, *Macoun* in 1895, *Can*. UTAH: DUCHESNE CO. Big Park, Uintah River Canyon, *Graham 8023, Pom-B, GH, Mo*. IRON CO. Brian Head Ranger Station, Sevier National Forest, *Eggleston 8433, Mo*. GARFIELD CO. 2 miles north of Posey Lake, Aquarius Plateau, *Maguire 20582, GH, WSC* (in part), *Utah*. ARIZONA: Common north of the Grand Canyon; occasional north of the Mogollon Rim and in the White Mountains, but largely replaced by var. *subsagittatus*. NEW MEXICO: RIO ARRIBA CO. Between Chama and Pogosa Springs (Colorado), *A. Nelson 10480, NY, DS, Pom-B, RM, Mo, Utah, WSC*.

Type collections.—(1) *R. cardiophyllus*, "Hab. From Canada to lat. 55°. In the central prairie & limestone districts. *Dr. Richardson. Drummond*. Alpine prairies in the Rocky Mountains. *Drummond*." Possible type material ex. herb. J. Gay, purchased by Dr. Hooker, *GH*, photograph *Pom-B*, also Franklin Exped., *GH*. (2) Var. *lasiocarpus*, "Columbia River between the Spokane and Fort Colville." *Wilkes Expedition*. (3) Var. *validus*, "Taking the slender, high-northern form with even the leaves sometimes 'pedately multifid' as the original of the species, the above name may be given generally to the stouter and larger forms, of lower altitudes or elevations, with more succulent leaves, . . . to this belongs *R. cardiophyllus*, Hook., figured both in the Fl. Bor.-Am. & in Bot. Mag. t. 2999 but with the style too long." This name is considered to be a new one for *R. cardiophyllus* and to be based upon the same type. (4) Var. *pinetorum*, "'Abundant in pine woods, at Graham's Park, 7,800 ft.' southern Colorado, 12 May, 1899, C. F. Baker [327]." Type *HGr 2547*, isotypes *Pom 150652, NY*, photograph *Pom-B, RM 23173*, photograph *Pom-B, RM 169139*, photograph *Pom-B, UC 118258, GH, Mo* (not numbered), *US 368911*.

48b RANUNCULUS CARDIOPHYLLUS var. SUBSAGITTATUS (A. Gray) L. Benson
Amer. Jour. Bot. 27: 187. 1940
(Liberal policy: *R. subsagittatus* (A. Gray) Greene)

R. arizonicus Lemmon var. *subsagittatus* A. Gray, Proc. Amer. Acad. 21: 370. 1886. *R. subsagittatus* Greene, Pittonia 2: 59. 1890.

Stems scapose, 1-1.5 or 2.5 mm. in diameter, usually unbranched below, 1-3- or 4-flowered, a little fistulous, glabrous or pilose; basal leaf blades cordate or long-ovate or rarely subsagittate, 1.5-4.5 cm. long, 1-4 cm. broad, crenate, proximally cordate (often deeply so) or rounded and distally rounded or obtuse or acute, the petioles pilose or glabrous, the stipular leaf bases 1-2 cm. long; cauline leaves all bracts, consisting of 1-5 linear divisions; petals 5, yellow, glossy on only the distal portions, obovate or obovate-obdeltoid, sometimes deeply emarginate, 7-15 mm. long, 5.5-13 mm. broad, the nectary scale oblong; achenes mostly 20-50 in an ovoid head usually 5-6 mm. long and 4-6 mm. in diameter, the achene beak straight; receptacle ovoid, 1-2 mm. long in flower, 4-7 mm. long in fruit.

Mountain meadows and stream banks at 7,500 to 10,000 feet elevation; Rocky Mountain Forests. Northern and east-central Arizona and the Mogollon Mountains, New Mexico. July and August.

Significant specimens.—ARIZONA: Abundant south of the Grand Canyon; less common in intergrading with var. *typicus* northward.

NEW MEXICO: Mogollon Mountains along Willow Creek, *Goddard 738, UC.* CATRON CO. 20 miles northeast of Mogollon, *Hitchcock, Rethke, & Raadshoven 4411, UC, CAS, WSC, GH, Wash, DS, Utah.* SOCORRO CO. Gila River, *Metcalfe 531* in 1903, *NY, HGr Clo, GH, RM, Mo;* Mogollon Mountains, *Wooton* in 1900, *US;* Beartrap Canyon, San Mateo Mountains Datil National Forest *Eggleston 18649, US.*

Type collection.—"North Arizona in De La Vergne Park of the San Francisco Mountains, in wet ground, *Lemmon.*" *No. 3266,* Aug., 1884. Type, *GH,* photograph *Pom-B;* isotype, *UC 194709,* probable isotype, *WSC.*

49 **Ranunculus coloradensis** L. Benson, comb. nov.

R. cardiophyllus Hook. var. *coloradensis* L. Benson, Amer. Jour. Bot. 27: 804. pl. 1. f. 7. 1940.

Basal and lower cauline leaves ovate, the bases acute or obtuse, shallowly crenately-toothed; petioles of the basal leaves 8-18 cm. long; petals oblanceolate-obovate, 5-10 mm. long; otherwise similar to *R. cardiophyllus.*

Mountain meadows at about 9,500 feet elevation; Rocky Mountain Forests. Arapho National Forest, White River Region, and vicinity of Silverton. July.

Specimens examined.—COLORADO: Arapaho National Forest, *McDougall* in 1925, *Ill.* RIO BLANCO CO. Head of Miller Creek, White River Region (occasional in occurrence), *Tidestrom 1675,* Aug. 7, 1908, *US 507892.* SAN JUAN CO. Silverton, probably *Crandall* in 1898, *NY,* photograph *Pom-B, CSC, RM,* photograph *Pom-B* (type and isotypes, cf. below).

Type collection.—"Silverton, Colorado, 9,500 feet elevation, Herbarium of the State Agricultural College of Colorado, (collector not designated [probably *C. S. Crandall*]), July 3, 1898. Type in the New York Botanical Garden." Type, *NY,* photograph *Pom-B;* isotypes: *CSC, RM 42619* (*collector's number 413*), photograph *Pom-B.*

50 RANUNCULUS AURICOMUS L.

Subglabrous (puberulent above) terrestrial perennials; roots filiform, numerous, 0.2-0.6 mm. in diameter; stems suberect or reclining, not rooting, 1 or 2-5 dm. long, 1-2 or 3.5 mm. in diameter, mostly 2-5-flowered, slender but slightly fistulous, glabrous; basal leaf blades simple, reniform at least in outline, mostly 3-4.5 cm. long, 4-7 cm. broad, merely crenately toothed to 3-5-divided and again lobed and toothed, proximally cordate and distally rounded in outline, finely sparsely pubescent, the petioles 1-1.5 or 2 dm long, glabrous, the stipular leaf bases small, becoming fibrous; cauline leaves alternate, the bracts of 3-9 linear divisions, sessile; pedicels 2-3 cm. long in flower, 4-8 cm. long in fruit, with appressed short curly hairs; sepals 5, greenish, spreading, elliptic, 3.5-6 mm. long, 3-4 mm. broad, apparently promptly deciduous; petals 5, yellow, cuneate-obovate to orbicular, 8-10 mm. long, 6-9 mm. broad, the nectary scale forming a pocket, usually glabrous, but sometimes pubescent and the basal portion of both surfaces of the petal also pubescent; stamens 10-20;

achenes about 10-20 or 30 in an ovoid-globose head 7-10 mm. long and 6-9 mm. in diameter, each achene flattened-obovoid, 2.5-3 mm. long, 2 mm. dorsoventrally, 1 mm. laterally, smooth, densely canescent or glabrous, the margin inconspicuous, the achene beak slender, 0.6-0.8 mm. long, recurved; receptacle cylindroid to narrowly obovoid, 1-2 mm. long in flower, 2.5-3.5 mm. long in fruit, glabrous or rarely sparsely puberulent.

Inclusion of this species is based wholly upon Sørenson's report of it (cf. below) for both var. *typicus* and var. *glabrata* and upon his excellent photographs. Obviously inclusion of *R. auricomus* in the North American flora must be tentative pending seeing of actual specimens. It has been reported occasionally by others, but this has been due to confusion, especially with *R. pedatifidus*.

50a RANUNCULUS AURICOMUS var. TYPICUS G. Beck.

R. auricomus L. Sp. Pl. 551. 1753.

Stems relatively tall and stout, 2-5 dm. long, 1 or 2-3.5 mm. in diameter; basal leaves 3-4.5 cm. long, 4-7 cm. broad; achenes densely canescent.

Northern Europe and Asia; reported and well-photographed by Sørenson (Meddel. Grønl 101(3): 53-4. *pl. 3 f. 4-7.* 1933) from one collection in Greenland, as follows: "Another collection of Ranunculus. . . . labelled 'leg. N. HARTZ ad Scoresby Sund, fugtig Skraent 200' o. H. (moist slope c. 60 m. above sea-level), 7/7 1892'. . . . is doubtless *R. auricomus* L. (main species). In all respects it is larger and more robust than var. *glabrata* LYNGE, and has hairy ovaries. This locality, Scoresby Sound, Gaaseland, with a luxurient vegetation, is the only one known in Greenland for *R. auricomus* L. (main species)." Vascular plants of East Greenland, 71°N to 73° 30′ N.

Type collection.—"*Habitat in* Europae *pascuis humidiusculus.*"

50b RANUNCULUS AURICOMUS var. GLABRATA Lynge

Rept. Sci. Results Norweg. Exped. Novaya Zemlya 1921. 35. *pl.* 22. 1928.

Stems relatively short and slender, 1-2 or 3 dm. long, less than 1 mm. in diameter; basal leaves 1.5-2 cm. long, 2-3.5 cm. broad; achenes glabrous.

Novaya Zemlya and Greenland; reported and well-photographed by Sørensen (Meddel. Grønl. 101 (3): 53-4. *pl.* 2. 1933) from two collections from Greenland, as follows: Ymer Island, Sørenson, July 31, 1932 and "In the Arctic Herbarium of the Botanical Museum, Copenhagen, some specimens are found labelled "Nr. 352. *Ranunculus arcticus* RICHARDS. v. *amoena* (LEDEB.) Leg. C. KRUUSE ad Kap Dalton 69° 00′ n. Br. 20 Juli, 1900. . . ."

According to Sørensen, *loc. cit.*, "The essential difference [between *R. affinis* subsp. *Wilanderi* and *R. auricomus* var. *glabrata*] seems to be that the two stem-leaves, whose leaflets are rather linear or linear-lanceolate, [in *R. affinis* subsp. *Wilanderi* or this variety or form of *R. pedatifidus* in other words] are seated so close together as to form a veritable involucre as in *Anemone* and *Eranthis*." However this arrangement of cauline leaves does not hold for *R. pedatifidus* as a species.

Type collection.—"I. Gribovii Fjord, north side. II. Matotchkin Shar: Belushii Bay. Sukhoi Noss." Novaya Zemlya.

According to Lynge, "Habitually the plants agree entirely with *R. auricomus β sibiricus* Glehn. . . ." Without much additional study of these Old World plants, the writer would not feel himself in a position to evaluate the status of the other varieties.

51 RANUNCULUS PEDATIFIDUS J. E. Smith in Rees. Cyclop. 29: *Ranunculus* sp. no. 72. 1819, cf. Fern Rhodora 36: 92-96. *pl. 279-80*. 1934

R. affinis R. Br. Bot. App. Parry's 1st. Voy. 265. 1823. *R. arcticus* Richards. in Frankl. 1st. Jour. Bot. App. ed. 1. 741. 1823. *R. affinis* var. *leiocarpa* Trautv. Middendorf's Reise 1: 62. 1847. *R. vicinalis* Greene, Pittonia 4: 145. 1900. *R. verticillatus* Eastw. Bot. Gaz. 33: 144. *f. 3*. 1902. *R. apetalus* Farr, Ottawa Nat. 20: 110. 1906, not *R. affinis* var. *apetalus* D. Don in 1831. *R. pedatifidus* var. *leiocarpus* Fern. Rhodora 19: 138. 1917.

At least sparingly pilose terrestrial perennials; roots about 0.6-1 mm. in diameter; stems erect, not rooting, 2-4 dm. long, 2-3 or 4 mm. in diameter, with 1-5 or 8 flowers, somewhat fistulous, pilose to nearly glabrous, striate; basal leaf blades simple, cordate in outline, 1.5-3.5 cm. long, 1.5-4 cm. broad, pedately divided or parted into 5-7 linear divisions some of which are again lobed, the blade proximally cordate, the lobes distally acute or obtuse, thinly pilose to glabrous, the petioles 4-10 cm. long, pilose, the stipular leaf bases 1.5-3 cm. long; cauline leaves alternate, the bracts divided into 3-7 linear lobes, sessile; pedicels 1.5-7 cm. long in flower, 5-14 cm. long in fruit, pilose, often densely so; sepals greenish-yellow, but ashy with dense pubescence, spreading, obovate, deeply concave, the tips abruptly becoming petaloid, 4-6 mm. long, 3-5 mm. broad, densely pilose dorsally, about half the length of the petals, tardily deciduous after anthesis; petals 5 or rarely none, yellow, broadly cuneate-obovate, 8-10 mm. long, 5-7 mm. broad, the nectary scale glabrous, forming a pocket about 0.4-1.5 mm. long and 0.4 mm. wide, sometimes deeply parted, truncate; stamens 25-60; achenes 25 or usually 40-70 in a cylindroid head 8-10 mm. long and 5-6 mm. in diameter, each achene flattened-obovoid, 2 mm. long, 2 mm. long, 1.5 mm. dorsoventrally, 0.6-0.8 mm. laterally, smooth, very finely canescent or glabrate, the margin inconspicuous, the beak slender, 0.6-1 mm. long, recurved; receptacle ovoid, obovoid, or cylindroid, 2-3 mm. long in flower, 7-9 mm. long in fruit, canescent.

Meadows at low elevations on the Arctic plains or in the mountains ranging from 2,500 to 5,000 feet elevation in Alberta to 9,000 to 14,000 feet in Colorado; Arctic and Alpine Grassland and Tundra, Northern Forest, and Rocky Mountain Forests. Apparently circumpolar; northern Alaska to the Canadian Arctic Islands, Labrador, Newfoundland, and Greenland and southward to Alberta and Saskatchewan; Columbia Falls, Montana; Gaspé Peninsula, Quebec; Wyoming and Colorado; in modified form in southern Utah and northern Arizona. June and July.

An apetalous form occurs in the Rocky Mountains from Athabasca River to Banff and in Gilpin County, Colorado. It was collected also by Hall and Harbour in Colorado in 1862 (*US*) but the locality was not given.

A form collected on Mt. San Francisco, Arizona (*Little 4609, Pom-B,*

4632, Sac, Pom-B) and on loose calcareous slopes near snow banks at 11,800 feet on the northeast side of Delano Peak in the Tushar Range in Puite County, Utah (*Maguire 19278* in 1940, *UA, Utah, Haycock 83* in 1930, *Utah*), may or may not be a new variety. It has the following characters: Stems 4-15 cm. long; basal leaf blades 1-2 cm. long, deeply lobed or cleft into simple lobes, the upper lobes erect, the lower markedly divergent or somewhat reflexed; petals none.

Significant specimens.—BRITISH COLUMBIA: Bluster Mountain, *J. W. & E. M. Thompson 392, Pom-B, CAS, Wash, Can.*

QUEBEC: Only the Gaspé Peninsula cited, as follows: Mt. Blanc, Matane Co., *Pierce & Hodge 8A* in 1934, *GH.*

MONTANA: FLATHEAD CO. Columbia Falls, *R. S. Williams* in 1894, *GH.*

WYOMING: Table Mountain, *A. Nelson 126, Ill, US.* ALBANY CO. Telephone Mines, *A. Nelson 7933, NY, Pom, RM, Ill, GH, US.*

COLORADO: numerous collectors.

Type collections.—(1) *R. pedatifidus*, "Native of Siberia. Four specimens from that country are in the Linnaean herbarium. . . ." According to Simmons, there are four individual plants in the Linnaean Society Herbarium labelled in Smith's handwriting, "R. pedatifidus Sm. in Rees' Cyclop. n. 72." (Cf. Simmons, Vasc. Pl. Ellesmereland, Rept. 2nd. Norwegian Arct. Exped. 101-108. 1906; Fern. Rhodora 36: 92-96. pl. 279. 1934.) (2) *R. affinis*, "Collected in Melville Island, By the officers of the Expedition." "Chiefly in the vicinity of Winter Harbour . . . herbaria of Captain Sabine, Mr. Edwards, Mr. James Ross, Captain Parry [Parry's Collection, acc. Hook. Fl. Bor. Amer. 1: 13. 1829], Mr. Fisher & Mr. Beverly." (Cf. Simmons, loc. cit. 101-108. Possible type collection: N. W. Amer. Franklin Exped. Dr. Hr., *GH* (Bost. Soc. Nat. Hist. Possibly not Parry's collection, though, but perhaps a later one. (3) *R. arcticus*, "(B.)" "(B.) Denotes the Barren Grounds from Point Lake to the Arctic Sea." Concerning dates of publication of *R. affinis* and *R. arcticus*, Simmons, *loc. cit.* 54, argues as follows: "The name *R. arcticus* was first used by RICHARDSON . . . the same year as that in which Chloris Melvilliana of R. BROWN appeared, but in the second edition of Franklin's narrative, RICHARDSON cancels his first name and uses that of ROB. BROWN. This may perhaps show that Chlor. Melv. was printed first, and that RICHARDSON therefore accepted the name given by BROWN instead of that he had established himself." (4) Var. *leiocarpa*, "In speciminibus taimyrensibus omnibus Ranunculi affinis R. Br. ovaria prorsus glabra sunt. . . ." Fernald's (*loc. cit.*) application of this varietal epithet was to a glabrous-fruited population occurring in eastern Arctic America. Cf. also Fern. Rhodora 36: 92-97. *pl. 279-80.* 1934. We have not seen the type. (5) *R. vicinalis*, "At Fort Selkirk on the Yukon River, in dry gravelly soil, 9 June, 1899, M. W. Gorman." Type *HGr 2830;* isotypes, *NY*, photograph *Pom-B, Wash (J. W. Thompson Herb. 21411)*, photograph *Pom-B, US 377083.* (6) *R. verticillatus*, ". . . collected at Nome City during the flowering season of 1900." "Plants collected by Dr. F. E. Blaisdell at Nome City, Alaska." Cape Nome according to the type specimen. Type, *CAS 26035* (pre-earthquake *1042*), photograph *Pom-B;* isotypes *NY, GH, US 421397.* A slender form with the nectary scale deeply parted. Collected later at Nome by *J. P. Anderson 3192, ISC, 3748, ISC.* (7) *R. apetalus*, "By the roadsides at Banff, Alberta," *Edith M. Farr*, June 28, 1905. Isotype, *GH*, photograph *Pom-B.*

Alleged differences between restricted Asiatic *R. pedatifidus* and the apparently circumpolar *R. affinis R. Br.* are described by Simmons, Vasc. Pl. Ellesmereland 102. 1906, as follows:

The characters that especially separate *R. pedatifidus* from *R. affinis* are: the almost circular circumference of its basal leaves, that are deeply cut in a great number of very narrow, almost entirely linear, segments, with obtuse points, evidently grouped after a pedate design, with a smaller middle, two larger lateral main lobes. The middle

lobe is equipped with two lateral secondary lobes halfway from the base, and these show a tendency to be again cleft. The lateral lobes are deeply cut into at least three or four secondary lobes, that only cohere a little above the bases, and again deeply cleft. The leaf is thus formed of a great number of narrow, or almost filiform, segments. The basal leaves are more or less equipped with sparse white hairs. The stem leaves are sessile or have a very short peduncle. The lower ones resemble basal leaves, but their segments are longer, do not stand so close together, and become fewer in the upper leaves, finally being only three. The sheath of the stem leaves is half-embracing, not so white-membraneous as in *R. affinis*. The plant is smaller and more slender in all parts, the flowers are not inconsiderably smaller. The white hair-covering of the stem is more prominent, and not reduced only to the parts immediately below the insertions of the leaves. Especially the part of the stem below the lowest leaf is hairy. The flowering stalk is, in dried specimens at least, prominently canaluliculate.

The true *R. pedatifidus*, SM. is, as far as I know, only found in Asia, especially in Eastern Siberia and also in the islands of the Bering Sea. . . . The only time I found this species, August 8, 1900, it bore flowers as well as fruit in all stages abundantly.

The following is the rebuttal of Fernald, Rhodora 36: 95-6. 1934:

The series to which *R. pedatifidus* and *R. affinis* belong is most difficult and the intricate relationships and interrelationships can not satisfactorily be resolved in a single limited herbarium nor on the basis of knowledge of variation gained from a single field-experience. One of the type sheets of *R. pedatifidus* has been photographed through the great kindness of Dr. H. K. Svenson, who, while in London arranged with Mr. R. G. Pugsley at the Linnaean Society for the photographing of it. This photograph (Plate 279) shows the basal leaves more uniformly, deeply and numerously divided than in most of the Arctic plant. The original specimens, collected in Siberia by Gmelin, are very closely matched by the equally beautiful material (Plate 280, Fig. 1) collected on Mt. Sinjucka in the Altai by Krylov on May 22, 1901, and originally called *R. affinis* R. Br., but later changed to *R. amoenus* Ledeb.

Although this Siberian (Altai) plant, true *R. pedatifidus*, is not absolutely matched by American material, its only sharp difference, so far as I can make out from the photograph of the Gmelin material (the type) and the Krylov sheet, is the more uniformly dissected foliage. Many North American and Greenland specimens are as pubescent; the sepals and their minute pilosity are closely matched by those of several Arctic American specimens and the carpels (in the Krylov material) are not, to me, different. In North America the plant varies excessively in foliage, just as do many other species of the group. In the Rocky Mountain area the basal leaves may be very similar (Plate 280, Fig. 2) to those of Smith's type or they may be uncleft, *R. pedatifidus*, var. *cardiophyllus* (Gray) Britton.* Eastward and in the Arctic the uncleft leaves are rare, but most of the basal leaves are less cleft than in the Asiatic type. So complete a series (Plate 280, Figs. 2-4), however, can be built up from specimens of North America (including Greenland) that I am at a loss to find anything more than geographic varieties, certainly not distinct species, among these plants. The Ellesmereland plant was beautifully illustrated by Simmons (his plate 4, figs. 2-5) and, although he states that *R. pedatifidus* 'is smaller and more slender in all parts, the flowers not inconsiderably smaller,' his plate (x½) does not well sustain this differentiation. In unfavorable situations such as those of the type-collection (Plate 280, Fig. 4) of *R. affinis*, it may mature with a total height of a few centimeters; in more favorable environment, it may be 4 dm. high, but without change of the morphological characters. Until it is more convincingly demonstrated than has yet been done that *R. affinis* and *R. pedatifidus* are specifically distinct, I am compelled to consider them two geographic varieties of a very polymorphous circumpolar species."

Hultén, Fl. Alaska & Yukon, Lunds Univ. Arssk. II. 40(1): 747. 1944, makes the following statement, "Closely related [to *R. affinis* of his Flora] is the central Asiatic *R. pedatifidus* SM. in Altai and adjacent mountains and in Tibet, Kansu and

* As shown by the writer, inclusion of *R. cardiophyllus* as a variety of *R. pedatifidus* is not tenable (Cf. Amer. Jour. Bot. 27: 799-801. 1940; Bull. Torrey Club 68: 642-3, 647-9. 1941). This strengthens Fernald's argument.

Yunnan. It is possible that *R. affine* should rather be taken as a geographical race of *R. pedatifidus*, but a monographical treatment of the entire group is needed before a proper judgment to be formed."

The writer is in agreement with Fernald that *R. pedatifidus* is a polymorphous species. Segregation of varieties on the basis of the evidence so far assembled would be inaccurate, and further study is necessary. The figures in plates 279 and 280 of *Rhodora* (Cf. Fern. above) are convincing evidence that *R. affinis* is not a species separate from *R. pedatifidus*, though it may or may not be a geographically segregated variety.

R. affinis R. Br. var. *Wilanderi* Nathorst, Konigl. Svenska Vet.-Akad. Handlingar 20(6): 23. 1883, has been thought by some authors to occur in Greenland, and plants referred to this entity have been differentiated by the following characters: Low, caespitose; fruiting head subglobose, not cylindroid; carpels thinner, the bodies a little longer than the recurved, coarse beaks. Plants of this type are figured by Andersson & Hesselman, Bihang Konigl. Svenska Vet.-Akad. Handlingar 26. Afd III. (1): 54. *f. 26.* 1900. Sørensen, Meddel. Grønl. 101(3): 54. 1933, does not mention this plant as occurring in Greenland, and he states that " . . . they exhibit a considerably closer affinity to *R. auricomus* var. *glabrata* than to *R. affinis* [*R. pedatifidus*]. . . .The essential difference seems to be that the two stem-leaves, whose leaflets are rather linear or linear-oblanceolate, are seated so close together as to form a veritable involucre as in *Anemone* and *Eranthis*." A photograph of a topotype of var. *Wilanderi* from Cape Thordsen, Spitzbergen, Jorgensen, Aug. 9, 1896 is given by Sørensen, *loc. cit., pl 3. f. 1-3.* The type of this apparently extraterratorial plant was as follows: "1870 (W. et N.") "Willanders och mina fynd i Ssfjorden och Belsund." "Kap Thordsen på tvenne ställen (återfanns derstädes 6/8 1882)."

51 RANUNCULUS EASTWOODIANUS L. Benson,
Amer. Jour. Bot. 27: 804. *pl. 1. f. 13.* 1940

Practically glabrous terrestrial perennials; roots less than 1 mm. in diameter; stems erect, not rooting, 3 dm. long, 2.5-3 mm. in diameter, branching 8-10-flowered, somewhat fistulous, striate, sparsely pilose to glabrous; basal and lower cauline leaf blades simple, flabellate in outline, 2.5-3 cm. long, 3-4 cm. broad, divided and parted into about 7 linear divisions 1.5-2.5 mm. broad, the leaf proximally cuneate and the divisions distally rather blunt, glabrous, or with a few long hairs; the petioles about 10 cm. long, sparsely pilose, the stipular leaf bases about 2.5 cm. long; cauline leaves alternate, like the basal but shorter-petioled, the bracts of 3-5 linear divisions; sessile; pedicels 2.5-7 cm. long in flower, thinly pilose; sepals yellowish-green, spreading, narrowly elliptic, 5 mm. long, about 2.5-3 mm. broad, thinly pilose dorsally, half or three-fifths the length of the petals; petals 5, yellow, cuneate-obovate, about 9-10 mm. long, 5 mm. broad, the nectary scale glabrous, horseshoe-shaped, the basal portion forming a pocket, the margins attached to the petal and produced distally as flaps 4-5 mm. long and 0.6 mm. broad, the tips sometimes free; stamens about 40-50; achenes about 40-80 in a cylindroid head 8-12 mm. long and 6-7 mm. in diameter, each achene flattened-obovoid, 1.5 mm. long, 1.2 mm. dorso-

ventrally, 0.6 mm. laterally, smooth, glabrous, the margin well marked but not conspicuous, the beak slender, 0.3-0.5 mm. long; receptacle cylindroid, about 2.5 mm. long in flower, 7-10 mm. long in fruit, canescent.

Alaskan coast at Skagway; Gold Run Creek, Yukon. Allied closely to *Ranunculus pedatifidus* J. E. Smith and possibly only a variety of it, but this remains to be determined in accordance with additional data and study of the entire complex of *R. pedatifidus*.

Specimens examined.—ALASKA: Skagway, Huffine in 1925, *CAS* (type, cf. below), photograph *Pom-B*.

YUKON: Gold Run Creek, *Macoun* in 1902, *Geol. Surv. Can. 58342, Can*, photograph *Pom- B*.

Type collection.—"Skagway, Alaska, *Louise Huffine*, summer 1925, *California Academy of Sciences 138,383*."

53 **Ranunculus montigenitus** L. Benson, sp. nov.

Sparsely pilose terrestrial perennials; roots stout, sometimes thickened, 2-3 mm. in diameter; stems subscapose, suberect or reclining, not rooting, 2-3 dm. long, 1.5-3 mm. in diameter, 1-3-flowered, somewhat fistulous, sparsely pilose; basal leaf blades simple, ovate or oblong or sometimes an occasional one cuneate or cuneate-obovate and apically lobed or cleft, 2-4 cm. long, 1-3 cm. broad, ordinarily crenate, the teeth somewhat revolute and often each with a large apical gland, proximally truncate or angled, distally rounded or truncate, glabrous or very thinly pilose beneath or on the lower margins, the petioles 4-15 or 20 cm. long, thinly pilose, the stipular leaf bases glabrous; large cauline leaves none, the bracts consisting of 3-5 linear divisions, mostly sessile; pedicels 2-10 cm. long in flower, finely tomentose; sepals yellowish-green, spreading, narrowly elliptic, 4-6 mm. long, 2.5-4 mm. broad, thinly pilose, half to three-quarters the length of the petals, early deciduous; petals 5 or sometimes 6, cuneate-obdeltoid, 8-10 mm. long, 7-8 mm. broad, with a distinct claw, the nectary scale forming a nearly complete pocket, glabrous, stamens 80-120; achenes about 20-30 in a globose or perhaps ovoid head about 5-6 mm. in diameter, each achene obovoid, 1.5 mm. long, 1.3 mm. dorsoventrally, 1 mm. laterally, smooth, glabrous, the margin inconspicuous, the beak slender, 1 mm. long, straight; receptacle obovoid-cylindroid, 1-2 mm. long in flower, 2-3 mm. long in fruit, pubescent.

Herba perennis terrestris pilosa; radicibus 2-3 mm. diametro; caulibus subscaposis, non e nodis radicantibus, 2-3 dm. longis, 1.5-3 mm. diametro, 1-3-floris, pilosis; foliis ovatis vel oblongis raro cuneatis vel cuneatis-obovatis, 2-4 cm. longis, 1-3 cm. latis, ad apicem crenatis, glabris vel pilosis; sepalis non reflexis, 4-6 mm. longis, 2.5-4 mm. latis, pilosis, circiter dimidio quam petalis brevioribus; petalis 5 vel 6, cuneatis-obdeltoidis, 8-10 mm. longis, 7-8 mm. latis, squamulis nectariis latere non liberis, glabris; carpellorum capitulo globoso, circa 5-6 mm. diametro; acheniis circa 20-30, obovoidis, 1.5 mm. longis, 1.3 mm. latis, laevis, glabris, rostro non curvato, 1 mm. longo; receptaculo obovoide-cylindroide, 2-3 mm. longo, pubescenti.

Moist ground at about 7,500 feet elevation in the mountains. Sierra Madre Occidental in Chihuahua, Mexico.

Specimens examined.—CHIHUAHUA: Sierra Madre near Colonia Garcia, *Townsend & Barber 42* in 1899, *Mich*, photograph *Pom-B*, *Pom-B*, *Pom*, *F*, *US*, *GH*, *Mo*, *NY*, *UC*, *RM*, photograph *Pom-B*; Mound Valley south of Pacheco, *Hartman 694*, *GH*, *PA*, *US*, *M. E. Jones* in 1903, *Pom* (type, cf. below).

Type collection.—Mound Valley, 7,000 feet, Sierra Madre, Chihuahua, *Marcus E. Jones*, September 18, 1903. Type, *Pom 99841*. Specimens collected in the Sierra Madre near Colonia Garcia, Chihuahua, Mexico, altitude 7,500 feet, *C. H. Townsend and C. M. Barber 42*, June 18, 1899, may be considered as authentic, but relatively immature. These are *Mich*, photograph *Pom-B*, *Pom-B 268464*, *Pom 99842*, *F 102806*, *US 347022 and 568095*, *GH*, *Mo 212030*, *NY*, *UC 135576*, *RM 55629*, photograph *Pom-B*. The type has flowers and several fruiting heads.

The species is related to *Ranunculus cardiophyllus* Hook. of the Rocky Mountains, and it is distinguished by the glabrous nectary scale, the glabrous achenes, and the ovate or oblong basal leaves. The foliage shows some affinity to *Ranunculus inamoenus* Greene var. *alpeophilus* (A. Nels.) L. Benson, but the large petals are the type of *R. cardiophyllus* and *R. pedatifidus* J. E. Smith. There is similarity to *R. coloradensis* L. Benson, as well. However, it is clearly distinct from any of the types mentioned above.

54 RANUNCULUS PERUVIANUS Pers.

Glabrous to somewhat pilose or tomentose terrestrial perennials; roots fibrous, slender or stout, not thickened into storage organs, 1-2.2 mm. in diameter; stems scapose, suberect, not rooting, 1.5-5 cm. long, 1-2 or 2.5 mm. in diameter, simple below, 1-10-flowered, slightly fistulous; basal leaf blades simple, cordate-ovate, orbicular, or rarely reniform or semicircular, 1.5-6.3 cm. long, 1.5-4.7 cm. broad, crenate, laciniate-dentate, or sometimes deeply serrate, proximally cordate or truncate, distally rounded, glabrous to slightly pilose or densely tomentose on the margins and sometimes on the faces; the petioles 2-15 cm. long, the stipular leaf bases glabrous, becoming fibrous in age; large cauline leaves none, the bracts consisting of 1 or 3-5 linear-spatulate or linear divisions, sessile; pedicels 1.5-8.5 cm. long in flower, 1.5-13.5 cm. long in fruit; sepals markedly reddish-purple, spreading, narrowly elliptic or elliptic, 3-5 or 6 mm. long, 2-3 mm. broad, hirsute, half as long as the petals, early deciduous; petals 5, obovate-obdeltoid, 8-10 mm. long, 6-7 mm. broad, the nectary scale forming a pocket, the pocket rarely shallow, glabrous; stamens 25-40; achenes 20-35 in a subglobose to elongate-ovoid head 4-8 mm. long and 3-5.5 mm. in diameter, each achene flattened-obovoid, 2 mm. long, 1.5 mm. dorsoventrally, 1 mm. laterally, smooth, glabrous, the margin inconspicuous, the beak slender, 1.5 mm. long, straight; receptacle cylindroid, 1-2 mm. long in flower, 3-4 mm. long in fruit, pubescent or sometimes glabrous.

54a RANUNCULUS PERUVIANUS var. **typicus,** nom. nov.

R. peruvianus Pers. Syn. Pl. 2: 103. 1807. *R. centellifolius* Standl. Field Mus. Publ. Bot. 17: 245. 1937.

Stems and petioles sparsely long-pilose below, the leaf margins and pedicels moderately tomentose; basal leaf blades orbicular-cordate or cordate-ovate, longer than broad, 1.8-3.5 cm. long, 1.3-3.2 cm. broad, crenate, proximally cordate with a narrow sinus; petals glabrous.

Meadows in the high mountains at 10,000 to 15,000 feet elevation. Mexico in the Sierra Madre Oriental in Neuvo Leon and western Vera Cruz; Guatemala above Totonicapán; Costa Rica; South America.

Specimens examined.—MEXICO. NUEVO LEON: Cerro Potosí, Galeana, *C. H. Mueller 2250, F, GH, Mich* (type and isotypes of *R. centellifolius*, cf. below), *R. A. Schneider 1041, F, Clo;* Pablillo, *Pennell 17066, US;* Sierra de la Cebolla, Montemorelos, *C. H. Mueller 2931, GH.*

VERA CRUZ: Mt. Orizaba, *Liebmann 1048, US;* Cofre de Perote, above Los Pescados, *Balls 4591, UC. US.*

GUATEMALA. QUEZALTENANGO: Totonicapán, *Seler 2372, NY, US, GH,* Lewis *925, F.*

COSTA RICA: Cerro de las Vueltas, San Jose Prov. *Standley & Valerio* in 1925-26, Field Mus. Exped. *43553, F, US, 43574, F, US;* Cerro de la Muerto, *Stork 3041, F.*

Type collections.—(1) *R. peruvianus*, "Hab. in Peruvia (Herb. Juss.)" (2) *R. centellifolius*, "Mexico, Abundant in meadows below timber line, peak of Cerro Potosi, Municipio de Galeana, Nuevo Leon, July 21, 1935, *C. H. Mueller 2250* (type in Herb. Field Mus.)." Type, *F 888440*, photograph *Pom-B;* isotypes, *GH*, photograph *Pom-B, Mich.*

54b **Ranunculus peruvianus** var. **Salasii** (Standl.) L. Benson, comb. nov.
(Liberal policy: *R. Salasii* Standl.)

R. Salasii Standl. Field Mus. Publ. Bot. 11: 154. 1936. *R. peruvianus* var. *Salasii* L. Benson ex Standl. & Steyermark, Fieldana 24(4): 252. 1946, as syn., nom. nud.

Stems and petioles glabrous at least below, the leaf margins and pedicels densely tomentose or nearly glabrous; basal leaf blades orbicular, reniform, or occasionally semicircular, as long as broad or sometimes broader than long, 1.5-4 cm. long, 1.5-4 cm. broad, laciniate-dentate or at least strongly dentate with angular teeth, proximally cordate or truncate with a broad sinus; petals usually pubescent dorsally.

Meadows at 9,500 to 10,000 feet elevation. Mountains of northwestern Guatemala.

Specimens examined.—GUATEMALA: Cumbres del Chol, *Salas 1410, F* (type, cf. below); Sierra Cuchumatanes, *Skutch 1097, F, NY, US, GH, Steyermark* in 1942, *Field Mus. Exped. 48250, F, 48408, F, 50140, F;* Desconsuelo, Totonicapán, *J. R. Johnston 1973, F;* Chemal, *J. R. Johnston 1731 & 1731a combined, F.*

Type collection.—"Guatemala: Cumbres del Chol, Dept. Huehuetenango, alt. 3,100 meters, April, 1931, *J. C. Salas 1410* (Herb. Field Mus. No. 647,687, type)." Type, *F 647687.*

55 RANUNCULUS HARVEYI (A. Gray) Britt.

Glabrous or very sparsely pilose terrestrial perennials; stems erect, not rooting, 2-4 dm. long, 1-4 mm. in diameter, branching, 5-10-flowered, somewhat fistulous, glabrous or sparsely pilose; basal leaf blades simple, reniform, distinctly broader than long, 1-4.5 cm. long, 1.5-4 cm. broad, crenate, sometimes some of them 3-parted or -divided, glabrous or sparsely pilose dorsally or in the sinuses, the petioles 4-9 cm. long, glabrous or sparsely pilose, the stipular leaf bases 1-2 cm. long, glabrous; cauline leaves few, the bracts with 3-5 oblanceolate, linear-spatulate or linear divisions, sessile; pedicels 1-3 cm. long in

flower, 3-13.5 cm. long in fruit, glabrous; sepals yellowish, spreading, obovate, about 4 mm. long, 2.5 mm. broad, glabrous, about half the length of the petals, early deciduous; petals 5-7, oblanceolate to narrowly elliptic, 6-8 mm. long, 2-3 mm. broad, the nectary scale forming a pocket, glabrous; stamens 25-50; achenes 20-50 in an ovoid or ovoid-cylindroid head 3-5 mm. long and 2.5-4 mm. in diameter, each achene discoid-obovoid, 1.4-1.5 mm. long, 1.3-1.5 mm. dorsoventrally, 0.6-0.8 mm. laterally, smooth, glabrous, the margin inconspicuous, the beak slender, 0.4-0.8 mm. long (or shorter in Alabama specimens), straight; receptacle fusiform-cylindroid, 1-2 mm. long in flower, 2-4 mm. long in fruit, glabrous or sparsely hirsutulous.

55a RANUNCULUS HARVEYI var. **typicus,** nom. nov.

R. abortivus L. var. *Harveyi* A. Gray, Proc. Amer. Acad. 21: 372. May 4, 1886. *R. Harveyi* Britt. Mem. Torrey Club. 5: 159. May 5, 1894. *R. abortivus* var. *grandiflorus* Engelm. ex Branner & Cov. Geol. Surv. Ark. 4: 162. 1891, nom. nud. *R. Harveyi* Greene, Erythea 2: 189. Dec. 1, 1894. *R. Harveyi* var. *pilosus* Benke, Rhodora 30: 200. 1928. *R. Harveyi* f. *pilosus* Palmer & Steyermark, Ann. Mo. Bot. Gard. 22: 540. 1935.

Some roots filiform, others stout, fusiform, and 1.5-2.5 mm. in diameter; stems glabrous or usually sparsely pilose; basal leaf blades 1-2.5 cm. long, 1.5-4 cm. broad, crenate with usually only 10-12 short lobes or a few leaves sometimes 3-parted or-divided, glabrous or sparsely pubescent dorsally, the petioles glabrous or sparsely pilose; achene beaks 0.4-0.6 mm. long (much shorter in Alabama specimens).

Moist woodland at low elevations. Southern Missouri and Arkansas; Jefferson and Tuscaloosa counties, Alabama. Late April and early May.

Significant specimens.—ARKANSAS: PULASKI CO. The following sheets of the Hasse collections, were taken at first as possible cotypes, but, in view of the date of publication, this is unlikely, cf. below: Little Rock, *Hasse* April, 1886, *GH, Pom-B 270722,* in 1886, *GH* photograph *Pom-B, DS 96260,* in May, 1886, *Pom-B 271177,* May 4, 1886, *NY* (3 sheets), photograph *Pom-B;* "Pulaski County," Hasse in April, 1886, *PA 586804, US 1084* and *1086.*

ALABAMA: JEFFERSON CO. Turkey Creek, south of Morris, Harper *3618* in 1938, *GH, Mo, PA, US.* TUSCALOOSA CO. Warrior River 10 miles above Tuscaloosa, *Harper* in 1932, *US, GH;* North River near Holt, *Moran 1341, DS.*

Type collections.—(1) Var. *Harveyi,* "On damp rocks in Arkansas, F. L. Harvey and Dr. Hass [Hasse]." The cotypes, *GH,* are not definitely separable on the sheet. Presumably, the two large-leaved plants at the right are the Hasse collection, but the specimens overlap. Collections made in the spring of 1886 probably did not reach Dr. Gray in time for consideration in his paper published May 4 of that year. A possible duplicate of the Harvey collection is "Cliffs N. W. Ark. *Harvey 174* in April, *US 1391400.* An 1885 collection by Hasse is, Little Rock, *Hasse,* April 18, 1885, *RM 148408.* (2) Var. *grandiflorus,* "Harvey," Arkansas. Probable isotype, "Rocks N. W. Ark,." *PA.* (3) Var. *pilosus,* "The type is from Rolla, Mo., Apr. 18, 1928, H. C. Benke 4575 in Field Museum." Isotype, *US 1486715.*

55b **Ranunculus Harveyi** var. **australis** (Brandegee) L. Benson, comb. nov.
(Moderate policy: *R. australis* Brandegee)

R. abortivus L. var. *australis* Brandegee, Zoe 4: 399. 1894. *R. australis* Brandegee, Zoe 5: 104. 1891.

Roots all alike, stout, not tuberous, 1.5-2 mm. in diameter; stems glabrous; basal leaf blades 2.7-4.5 cm. long, 3.5-6.3 cm. broad, crenate or sometimes deeply serrate with 15-30 short lobes or teeth, glabrous except for a few long hairs in the sinuses; achene beaks about 0.6-0.8 mm. long.

Moist places at high elevations on mountain summits. Sierra de la Laguna and Sierra de San Francisco, Cape Region of Baja California, Mexico.

Specimens examined.—BAJA CALIFORNIA: Sierra de la Laguna, *Brandegee*, Jan. 24, 1890, *UC*, Sierra de San Francisquito, *Brandegee 3*, Oct. 18, 1891, *UC 118232*, photograph *Pom-B;* Oct. 19, 1893, *NY*, photograph *Pom-B*, *GH*, in 1892-1899, *US*, in 1879, *Pom 150457*.

Type collection.—"Abundant in wet places on the high summits of Sierra de la Laguna and San Francisquito." The Sierra de Francisquito specimen in the Brandegee Herbarium (*UC 118232*, photograph *Pom-B*) is chosen as a lectotype. It includes fruits. Unfortunately, only one specimen of the variety (*GH*) has a flower.

56 RANUNCULUS ALLEGHENIENSIS Britt. Bull. Torrey Club 22: 224. 1895

Almost glabrous terrestrial biennials (?); roots all filiform; stems erect or suberect, not rooting, 1-5 dm. long, 1-7 mm. in diameter, freely branching, 15-40-flowered, fistulous, glabrous, striate; basal leaf blades simple or rarely some trifololiate, reniform, 1-3.5 cm. long, 1.5-4.5 cm. broad, crenulate or crenate, some 3-lobed, -parted, or -divided, ventrally sparsely appressed-pubescent, the petioles 2-10 cm. long, glabrous or nearly so, the stipular leaf bases scarious, 1-3 cm. long; cauline leaves alternate, the bracts deeply twice-parted, forming 5 linear lobes, sessile; pedicels 2-15 mm. long in flower, 0.5-5 or 10 cm. long in fruit, pubescent or glabrous; sepals yellowish, spreading elliptic, 2.5-3.5 mm. long, 1.2-1.8 mm. broad, sparsely hispid dorsally, 2-3 times the length of the petals, deciduous after anthesis; petals 5, yellow, glossy, elliptic, 1-1.5 mm. long, about 1 mm. broad, the nectary scale forming a pocket, apically rounded, free on its distal lateral margins, glabrous; stamens 10-15; achenes 10-40 in an ovoid head 3-5 mm. long and 2.5-4 mm. in diameter, each achene discoid-obovoid, 1.5-1.6 mm. long, 1.4-1.6 mm. dorsoventrally, 0.5-0.7 mm. laterally, smooth, glabrous, the margin inconspicuous, the beak slender, 0.6-1 mm. long, curved or recurved; receptacle fusiform-cylindroid, about 2 mm. long in flower, 2-4 mm. long in fruit, sparsely villous.

Moist woodland; Northern and Deciduous forests. Rare in Ohio and Tennessee, common in Massachusetts, occasional elsewhere in New England (except Maine); Genessee County and southeastern New York and southward in the mountains from West Virginia and Pennsylvania and to Virginia; Waynesville, North Carolina. May and early June.

Significant specimens.—OHIO: FAYETTE CO. Fyle, *Brown, Crawford, & Van Pelt 76* in 1905, *PA*. TRUMBULL CO. *Rood 1529* in 1923, *GH*.

TENNESSEE: Cumberland Plateau near Beersheba Springs, *C. A. & U. F. Weatherby 6278*, *GH*.

NEW YORK: GENESEE CO. LeRoy, *Wiegand 13954*, *GH*, *Mo*. WASHINGTON CO. Fort Ann, *Burnham* in 1900, *GH*. GREENE CO. Catskill, *House 7832*, *GH*. DUTCHESS CO. Unionville, *Svenson 8396*, *Clo*.

NORTH CAROLINA: HAYWOOD CO. Waynesville, *Standley 5571*, *US*.

Type collection.—"Mountains of Virginia & North Carolina." The following specimen has been designated as a lectotype, cf. L. Benson, Bull. Torrey Club 68: 646. 1941, White Top Mountain, Grayson County, Virginia, *N. L. & E. G. Britton and A. M. Vail*, May 38, 1892. Lectotype, *NY*, photograph *Pom-B*.

57 RANUNCULUS MICRANTHUS Nutt. ex Torr. and Gray, Fl. N. Amer. 1: 18. 1938

R. abortivus L. var. *micranthus* A. Gray, Man. Bot. ed. 2. 9. 1856. *R. cymbalistes* Greene, Amer. Midl. Nat. 3: 333. 1914. *R. delitescens* Greene, *loc. cit.*

Villous terrestrial perennials; some roots filiform and some fusiform-tuberous and 1.5-2 mm. in diameter; stems erect, not rooting, 1.5-4 dm. long, 1.5-4 mm. in diameter, branching, mostly 8-25-flowered, at least somewhat fistulous, villous, basal leaves simple and ovate, obovate, or semicircular or else 3-foliolate and the leaflets cuneate, obovate, or oblanceolate, 1-2.5 cm. long, 1-2.5 cm. broad, usually longer than broad, crenulate to crenately lobed, proximally almost always not cordate or notched, sparsely villous, the petioles 3-8 cm. long, the stipular leaf bases about 1 cm. long; cauline leaves alternate, the bracts with 3 or 5 linear-oblanceolate divisions, sessile; pedicels 3-20 mm. long in flower, 15-90 mm. long in fruit, glabrous or sometimes villous; sepals yellowish, spreading, obovate, 2.5-3.5 mm. long, 1.5 mm. broad, pubescent or glabrous, 1.2-1.5 times the length of the petals, deciduous after anthesis; petals 5, yellow, glossy, 2-2.5 mm. long, 1-1.5 mm. broad, the nectary scale glabrous, forming a pocket, truncate; stamens about 15-25; achenes 10-50 in a cylindroid head 3-6 mm. long and 2-4 mm. in diameter, each achene discoid-obovoid, 1.3-1.5 mm. long, 1.2-1.4 mm. dorsoventrally, 0.6-0.8 mm. laterally, smooth, glabrous, the margin inconspicuous, the beak slender, 0.2-0.3 or rarely 0.4 mm. long, curved; receptacle cylindroid, 1-2 mm. long in flower, 3-6 long in fruit, almost always glabrous, in many specimens the fruiting receptacle very slender and the attachment points of the achenes circular and conspicuous.

Low elevations: Deciduous Forest. Black Hills, South Dakota; eastern Oklahoma; Missouri to Arkansas, southern Illinois, southern Indiana, southern Ohio, Kentucky and Tennessee; Massachusetts to West Virginia and North Carolina. April or May.

Significant specimens.—SOUTH DAKOTA: Esto, Black Hills, *Visher 1562, NY*.

OKLAHOMA: CHEROKEE CO. Tahlequah, *Shinners 3617* (mass collection 59), *Clo.* ADAIR CO. Stillwell, *Osborn 1484R, Pom-B*.

INDIANA: Only the topotype of *R. cymbalistes* cited under type collections below.

OHIO: Ghanna (?), *Gleason* in 1905, *GH*. HAMILTON CO. *Lea, PA;* Cincinnati, *Lea, PA, G. C. Lloyd* in 1883, *GH*. FRANKLIN CO. Columbus, ..., *GH*.

KENTUCKY: CAMPBELL CO. Tippenhauser Road south of Newport, *Braun 3841, GH*. MCCRACKEN CO. Paducah, *Eggleston 4488, NY*.

TENNESSEE: Vesta, *Svenson 7746, GH*. POLK CO. Ducktown, *McVaugh 4737, Clo*.

WEST VIRGINIA: MONONGALIA CO. Morgantown, *Myers 117* in 1938, *Clo, Mr. & Mrs. H. A. Davis 6212, WSC*.

VIRGINIA: JEFFERSON CO. Harpers Ferry, *Coville* in 1889, *US* (cotype of *R. delitescens*, cf. below). SURRY CO. Claremont Wharf, *Wilkens 6132, UPa*.

NORTH CAROLINA: FORSYTH CO. Salem Square, *Schallert* in 1934, *CAS;* Salem, *Schweinitz, PA*. DURHAM CO. Duke Forest, *Blomquist 247* in 1932, *GH*.

Type collections.—(1) *R. micranthus*, "'Margins of ponds throughout the upper & western part of Missouri, likewise in Arkansas, collected by *Dr. Pitcher.' Nuttall!*" The *Pitcher* specimen in the New York Botanical Garden has been designated as a lectotype, cf. L. Benson, Bull. Torrey Club 68: 646. 1941. Lectotype, *NY*, photograph *Pom-B*. It was collected at Ft. Gratiot. *Nuttall* collection, *GH*, photograph *Pom-B*. (2) *R. cymbalistes*, "Known only as collected in extreme southern Indiana, 20 April, 1913, by Mr. Charles C. Deam, where it inhabits wooded knolls, under Pinus Virginiana & Quercus alba, the special locality 2 miles west of New Albany." Type, not seen or not recorded by the writer at the Herbarium Greeneanum in 1935 (when all specimens were examined); topotype, New Albany, Floyd County, *Deam 23263, NY*, photograph *Pom-B, GH, US*. (3) *R. delitescens*, "Known to me in only 2 sheets of specimens, both in the U. S. Herb., the best one being from rocky woods at Guttenberg, New Jersey, 12 May, 1895, by William Van Sickle; the other from Harper's Ferry, W. Va., 11 May, 1889, by F. V. Coville." The Van Sickle collection is designated as a lectotype. Lectotype, *US 244253*, photograph *Pom-B*.

A curious plant related to *Ranunculus abortivus* L. and *R. micranthus* Nutt. is in the Herbarium of the University of Wisconsin. The following are its significant characters as far as they can be determined from the specimen: Herbage villous; roots all filiform; basal leaf blades cordate; bracts of 3 linear-lanceolate divisions; petals about 4 mm. long, the nectary scales truncate; head of achenes probably ovoid (but mature fruits not available), the achene beak 0.2-0.25 mm. long in young fruits. Low, marshy soil foot of east slope, Pine Hollow, Poynette, Wisconsin, *A. L. Frolick*, May 24, 1935.

58 RANUNCULUS ABORTIVUS L.

Glabrous (or the young vegetative regions pubescent) terrestrial biennials (?); roots filiform, sometimes enlarged at the bases; stems erect or suberect, not rooting, 1-5 dm. long, 1-7 mm. in diameter, branching, mostly 15-50-flowered, fistulous, striate; basal leaves simple or rarely some trifoliolate, reniform or circular in outline, 1-5 or 8-9 cm. long, 1-6 or 8-10 cm. broad, crenulate, crenate, or crenately lobed, or some 3-lobed, -parted, or -divided, petioles 4-11 cm. long, stipular leaf bases scarious, 1-2 cm. long; cauline leaves alternate, the bracts deeply once- or twice-parted to form 3 or 5 elliptic lobes or rarely cuneate or obovate and apically shallowly lobed or toothed, sessile; pedicels 2-15 mm. long in flower, 10-50 or 90 mm. long in fruit, glabrous; sepals 5, yellowish, spreading, elliptic, 3-4 mm. long, 1-2 mm. broad, glabrous, 1.1-1.3 times the length of the petals, deciduous after anthesis; petals 5, elliptic, 2.5-3.5 mm. long, 1.3-2 mm. broad, the nectary scale glabrous, forming a pocket, emarginate; stamens 15-20; achenes 10-35 in an ovoid head 3-6 mm. long and 2.5-4 mm. in diameter, each achene discoid-obovate, 1.4-1.6 mm. long, 1.3-1.6 mm. dorsoventrally, 0.6-0.8 mm. laterally, smooth, glabrous, the margin inconspicuous, the beak 0.1-0.2 mm. long; receptacle fusiform-cylindroid, about 2 mm. long in flower, 2-4 mm. long in fruit, sparsely villous or sometimes glabrous.

58a RANUNCULUS ABORTIVUS var. TYPICUS Fern.

R. abortivus L. Sp. Pl. 551. 1753. *R. nitidus* Walt. Fl. Carol. 159. 1788. *R. abortivus* var. *nitidus* D. Don in G. *Don*, Gen. Syst. Gardening 1: 33. 1831. *R. abortivus* var. *sylvaticus* Lawson, Proc. & Trans. Nova Scotian Inst. Nat. Sci. 2(4): 38. 1870. *R. ruderalis* Greene, Amer. Midl. Nat. 3: 334. 1914. *R. Holmei* Greene, *loc. cit. R.*

michiganensis Farwell, Rept. Mich. Acad. Sci. 17: 169. 1916. *R. abortivus* var. *acrolosius* Fern. Rhodora 40: 418. *pl. 519. f. 1-2.* 1938. *R. abortivus f. coptidifolius* Fern. Rhodora 44: 408. 1942.

Stems erect or suberect, not markedly flexuous; basal leaf blades mostly simple and reniform or some of those on the plant rarely trifoliolate, 1-5 cm. long, 1-6 cm. broad, crenate or crenately shallowly lobed, or some 3-lobed, -parted, or -divided, proximally cordate, the sinuses broad; bracts deeply once- or twice-parted to form 3 or 5 elliptic lobes; receptacle fusiform-cylindroid.

Moist ground in rich woodland at low elevations; Rocky Mountain, Northern, Pacific, Deciduous, Southeastern Pine, and Riverbottom forests and the Prairie. Juneau, Alaska; British Columbia to Labrador and Nova Scotia and southward to the northeastern corner of Washington, southern Colorado, eastern Texas, and Chatachoochee, Florida; perhaps introduced in Cuba. March to June, depending upon locality.

Significant specimens.—ALASKA: Juneau, *J. P. Anderson 459, NY, 6249, Pom-B, PA, Trelease & Saunders 3831, Mo* (2 sheets), *Scamman 1132, GH.*

WASHINGTON: FERRY CO. Mouth of Nez Perce Creek, Columbia River, *H. T. Rogers 355, Pom-B, Pom, CAS, Clo, Utah, Mo, GH.* PEND OREILLE CO. 2 miles north of Newport, *Speigelberg 18* in 1923, *GH, Pom-B.*

IDAHO: Sin-yak-wah-teen, *Leiberg 2705, US.* KOOTENAI CO. *Leiberg 400, US.*

MONTANA: Holt, *R. S. Williams 323* in 1894, *RM, US.* FLATHEAD CO. Big Fork, *M. E. Jones 7942* in 1908, *Pom, DS.* MISSOULA CO. Rock Creek (Bonita on *GH* label), Missoula, *Kirkwood 1117, UC, RM, Mo, GH.* GALLATIN CO. Bozeman, *Scribner 4a* in 1893, *PA, E. J. Moore* in 1901, *Pom, GH, RM, UC, Wash, W. W. Jones* in 1901, *DS, CAS, RM, Mo, US, J. W. Blankinship 14* in 1905, *Pom.*

WYOMING: YELLOWSTONE NATIONAL PARK. *Essig* in 1907, *Pom.* CROOK CO. Hulett, *Ownbey 629, UC, Utah, Wash, WSC, RM, Mo, GH;* Sundance, *A. Nelson 2115, RM, Mo, GH;* Black Hills, *A. Nelson,* July 22, 1910, *RM, 9463,* July 23, 1910, *RM, GH.* ALBANY CO. Laramie River, *Osterhout* in 1896, *RM, 1111, RM.*

COLORADO: Various collectors.

FLORIDA: GADSDEN CO. Chattahoochee, *Chapman Herb.,* March 1897, *Mo* (2 sheets), *A. H. Curtiss* in 1880, *GH, Biltmore Herb. 840a, NY, GH.*

CUBA: Cultivated field at the Agronomic Station, Santiago de las Vegas, Havana, *Leon 10615, NY.*

Type collections.—(1) *R. abortivus,* "*Habitat in* Virginia, Canada." (2) *R. nitidus,* Carolina. According to J. Ramsbottom, Keeper of Botany of the British Museum, the type can not be found. (3) Var. *sylvaticus,* Sloate's Lake, Sydenham, Ontario, *Lawson,* June 1, 1859. Type at Mt. Allison University Herbarium; photograph, *GH.* (4) *R. ruderalis,* "First observed by me as growing on a railway embankment near Linden station of the Baltimore & Ohio Railway, within the State of Maryland, but not far outside the District of Columbia, this in May, 1912." Type, *HGr 13022-3.* (5) *R. Holmei,* "A common plant of low woodland borders and open thickets, in rich alluvial soil along the Potomac River & its tributaries in Maryland & Virginia." The following specimen has been designated as a lectotype, cf. L. Benson, Bull. Torrey Club 68: 645. 1941: Thicket near canal, below High Island, Maryland, *Greene,* Apr. 23, 1912, *HGr 13027.* (6) *R. michiganensis,* "Swamp lands near Rochester, Michigan, Farwell, No. 3627, May 17, 1914." Type, *Farwell.* (7) Var. *acrolasius,* "Shelburne [N. H.], May 17, 1910, *Deane* (TYPE in Herb. N. E. Bot. Cl.). . . ." This is a northern and Rocky Mountain form with the younger portions of the plant (stems, cauline leaves and pedicels) pubescent. Since varietal status would rest upon a single character, the writer considers this as a minor but significant form. (8) *F. coptidifolius,* "PENNSYLVANIA. rich woods near stream 5/8 mile southwest of junction of Big and Little Conestoga Creeks, Lancaster County, May 17, 1939, *Louise A. Tanger,* no. 3109

(TYPE in Herb. Phil. Acad.)" Type, *PA*, photograph, *GH*. The cauline leaves and bracts are large and in some respects transitional to the type in var. *indivisus*, but they are of a different shape and with more dentation or dissection.

58b RANUNCULUS ABORTIVUS var. EUCYCLUS Fern. Rhodora 1: 52. 1899

Stems elongated, slender and flexuous; basal leaf blades deeply cordate with a narrow basal sinus, 3.5-4.5 cm. long (on the axis), 4.5-6 cm. broad, the blade as a whole practically circular; bracts similar to those of var. *typicus;* fruiting receptacle slender.

Rich woods; Deciduous Forest. Quebec to Newfoundland and south to New York and New England.

Previously, the writer, Bull. Torrey Club 68: 645. 1941, included two specimens from the Middle West in this variety. In the current treatment these are eliminated and considerd as transitional between var. *eucyclus* and var. *typicus* as were other specimens from that area cited in the earlier paper. Definite restriction of the application of the varietal epithet to those plants having *both* the flexuous stems and the leaf type described above leaves a none-too-strong, but apparently recognizable northeastern variety. The mass collections of Fassett, Amer. Midl. Nat. 27: 512-522. 1942, shows the lack of reliability of the leaf character taken by itself to set off the variety. This character is found in some degree in many of the specimens studied by Fassett, nearly all of them from west and south of the range of var. *eucyclus* as defined here, and they confirm the occurrence of the leaf character alone here and there through much of the Middle West, as indicated (with citation of fewer specimens) by the writer, *loc. cit.* The actual strength of the combination of characters in particularly Quebec and New England well might form the subject of further investigation by intensive field study including mass collections. Pending such an intensive study, the conclusions presented here are tentative. It is possible that both characters are too vague to make the combination meaningful, and the writer has seen some evidence of this.

One collection of particular interest is a large plant described as *Ranunculus abortivus* f. *giganteus* Gates, Trans. Kans. Acad. Sci. 33:28. 1930. The fruiting receptacle is a nearly filiform type rarely equalled in narrowness in either var. *typicus* or var. *eucyclus,* and the basal leaves (of the var. *eucyclus* type) are 4.5-6 cm. long (on the axis), or 8-9 cm. if the basal lobes are included. The sinus is about 3 cm. deep. The flowers are not known. This form is remarkable for its size, but it is deficient in technical characters. In most respects it is transitional between vars. *eucyclus* and *typicus*. *Type collection:* "The type specimen, 50 cm. high, collected June 5, 1928, three miles southeast of Yates Center, Kansas, deposited in the herbarium of Kansas State Agricultural College, Manhattan, Kansas, by Mrs. C. E. Rogers" (O. E. Rogers on the label). The specimen was studied while on loan to the writer through the kindness of Dr. F. C. Gates.

Type collections.—(1) Var. *eucyclus*, "First collected by Miss Kate Furbish at East Livermore, June, 1888, and subsequently at Gilead in 1897." ". . . Gilead, Maine, August 10, 1897, *Kate Furbish*, in Gray Herb. designated as a lectotype, Fern. Rhodora 40: 420. 1938, *GH*, photograph *Pom-B*. Maine.

58c RANUNCULUS ABORTIVUS var. INDIVISUS Fern.
Rhodora 40: 418. *Pl. 518.* 1938

Herbage reported to be a darker green than in var. *typicus;* stems and basal leaf blades like those of var. *typicus,* but the teeth of the leaves very shallow; bracts cuneate or cuneate-obovate, apically shallowly-lobed or -toothed.

Alluvial woods of bottom-land; Stafford County to Nottaway River Valley, southeastern Virginia. April.

A rather questionable variety, but, at least a significant minor population.

Specimens examined.—VIRGINIA: STAFFORD CO. 3 miles south of Falmouth, *Fernald & Long 14148, GH.* SUSSEX CO. Nottaway River, southeast of Homeville, *Fernald & Long 10261, DS, GH;* Homeville, *Fernald & Long 11674, GH, 11830, GH;* Assamoosick Swamp, Homeville, *Fernald & Long 11829, GH.* SOUTHAMPTON CO. Three Creek, Drewryville, *Fernald & Long 7829, GH,* photograph *Pom-B, PA, Mo, US* (type and isotypes, cf. below). Other localities in the Nottaway River Valley, but the county not determined: Cypress Bridge, *Fernald & Long 8264, GH;* Burt, *Fernald & Long 7827, GH, Mo, CAS, UPa;* northeast of Lumberton, *Fernald & Long 7828, GH.*

Type collection.—"Three *Creek,* Drewryville, April 9, 1938, *Fernald & Long,* No. 7829 (TYPE in Gray Herb., ISOTYPE in Herb. Phil. Acad.). . . ." Type, *GH* (3 sheets), photograph *Pom-B;* isotypes *PA, Mo 1129728, US 1735721.*

59 RANUNCULUS DONIANUS Pritzel ex. Walp. Repert. 2: 740. 1843

R. humilis D. Don in G. Don, Gen. Syst. Gardening 1: 34. 1831, not Pers. in 1807.

Hirsutulous to subglabrous terrestrial perennials; roots thickened into elongated tapering storage organs about 1.5-2 mm. in diameter; stems scapoid, the branching portions only 1-2.5 cm. long, not rooting, the whole stem including the elongated pedicels 3-12 cm. long, less than 1 mm. in diameter, simple or once- or twice-branched below, 1-3-flowered, slightly to moderately hirsutulous; basal leaf blades simple, ovate, or subcordate or broadly so, 1-2 cm. long, 1-1.5 cm. broad, 3-lobed and the lobes again shallowly crenately few-lobed, proximally truncate or subcordate, distally rounded, glabrous to appressed-pubescent, the petioles mostly 1-5 cm. long, more or less hirsutulous, the stipular leaf bases 1-2 cm. long, nearly glabrous; cauline leaves alternate, a few near the base of the stem well-developed, petioled; pedicels 3-6 cm. long in flower, 4-10 cm. long in fruit, appressed-pubescent; sepals greenish with scarious margins, spreading, 2-3 mm. long, 1-1.5 mm. broad, slightly hirsutulous, about the length of the petals, promptly deciduous; petals 5, yellow, narrowly obovate, distinctly clawed, 2-3 mm. long, 1.5-2 mm. broad, the nectary scale forming a pocket; stamens 5-10; achenes 10-20 in a subglobose head 3-4 mm. in diameter, each achene compressed-obovoid, 1.5 mm. long, 1.2 mm. dorsoventrally, 1 mm. laterally, smooth, glabrous, the margin inconspicuous, the beak 0.2-0.3 mm. long, straight; receptacle obovoid, 0.5 mm. long in flower, 1 mm. long in fruit, sparingly hispidulous.

Moist ground of mountain peaks at 9,500 to 13,000 feet elevation. Mexico from Michoacán to western Vera Cruz and Oaxaca; Huehuetenango, Guatemala.

Specimens examined.—MEXICO. STATE UNKNOWN: *Sessé, Mociño, Castillo, & Moldonado* in 1787, 1795, or 1804, *F.*

MICHOACÁN: Mt. Tancitaro, *Leavenworth & Hoogstraal 1169, Mo, Ill.*

MEXICO: Crucero Agua Blanca, Dist. of Temascaltepec, *Hinton 4610, GH, US, NY;* Teotopec, Dist. Mina Cro., *Hinton 14458, US, GH;* Nevado de Toluca, *Pringle 5255, GH, Balls 4976, UC, US;* Ixtaccihuatl, *Purpus 61* in 1903, *Pom, US, UC, Mo;* Popocatepetl, *Rose & Hay 6002, GH, US.*

PUEBLA: Mt. Orizaba, *Pringle 8548, GH, F, Pom, US, Crn, UC, Mo, PA, NY.*

VERA CRUZ: Mt. Orizaba, *Seaton 235* in 1891, *GH, F, Rose & Hay 5755, NY, US;* above Los Pescados, Cofre de Perote, *Balls 4608 UC, US.*

OAXACA: Mt. Zempoaltepec, *E. W. Nelson 656* in 1894, *US.*

GUATEMALA: HUEHUETENANGO: Sierra de los Cuchumatanes, *Steyermark* in 1942, *Field Mus. Exped. 50300, F, 51939, F.*

Type collections.—(1) *R. humilis,* "Native of Mexico." "D. Don in herb. Lamb." It is probable that with this plant, as apparently with the type of *R. uncinatus,* the reference to D. Don in the Lambert Herbarium is to a collection merely identified by Don and collected by Sessé, Mociño, et al. If so, probably the plant in the Field Museum cited above (State Unknown) is a duplicate of the type. It is *F 845005.* (2) *R. Donianus,* nom. nov. for *R. humilis.*

60 RANUNCULUS JOVIS A. Nels. Bull. Torrey Club 27: 261. 1900

Ranunculus digitatus Hook. Kew. Jour. 3: 124. *pl. 4.* 1851, not Gilib. in 1781, not Willd. ex Ledeb. in 1842.

Glabrous terrestrial perennials; roots forming tubers 1-3 cm. long and 2 or usually 3-5 mm. in diameter, these terminating abruptly; stems erect, not rooting, 3-4 cm. long excluding the pedicels, 1-2 mm. in diameter, enlarged upward, 1-3-flowered; basal leaf blades divided into 3-5 oblanceolate, entire divisions 1-2 cm. long and 2-4 mm. broad, petioles 2-3 cm. long, stipular leaf bases 1-2 cm. long, membranous; cauline leaves alternate, opposite, or 3 in a whorl, divided into 3-5 oblanceolate leaflets, sessile; pedicels 1-2.5 cm. long in flower, 3-4.5 cm. long in fruit; sepals yellowish-green, spreading, narrowly elliptic, about 4 mm. long, 2 mm. broad, glabrous, about half the length of the petals, promptly deciduous; petals 5, yellow, narrowly obovate to oblanceolate, 5-10 or 18 mm. long, 2-2.5 mm. broad, the nectary scale glabrous, forming a pocket about 0.7 mm. long, truncate; stamens 10-20 or 25; achenes 15-70 in a globose or ovoid head 3.5-8 mm. long and 4-7 mm. in diameter, each achene oblong, 1.1-1.3 mm. long, 0.8 mm. dorsoventrally, 0.6 mm. laterally, smooth, very finely pubescent, the margin inconspicuous, the beak slender, 0.25-0.6 mm. long, not distinctly recurved; receptacle ovoid, 2 mm. long in flower, 2-6.5 mm. long in fruit, glabrous.

Moist ground near snowdrifts at 6,000 to 9,500 feet elevation; Rocky Mountain Forests. Yellowstone National Park and southwestward to Lincoln County, Wyoming, Idaho (Fremont County to Oneida County), and Utah as far south as Salt Lake County and western Summit County; Havallah Mountains, Nevada. April to July, depending upon altitude.

Specimens examined.—IDAHO: FREMONT CO. Henry Lake, *E. B. & L. B. Payson 1976, NY, CAS, RM, GH.* TETON CO. Victor, *R. J. Davis 14-35* in 1935, *ISB.* BANNOCK CO. Rapid Creek, *R. J. Davis* in 1941, *Clo;* Gibson Jack, Michaud Creek Divide, *Cronquist 16* in 1936, *Utah;* McCammon, *R. J. Davis 839* in 1939, *ISB, Pom-B, WSC, Utah;* Camp Tendoy, *R. J. Davis* in 1931, *ISB;* City Creek Canyon, *R. J. Davis* in 1935, *RM.* ONEIDA CO. Malad Divide, *R. J. Davis 15-31* in 1931, *ISB.*

NEVADA: Havallah Mountains, 8,000 feet, *S. Watson 25, NY*.
WYOMING: Limestone Station, Hayden Forest, *A. Nelson 11357, RM, Pom, UC, NY*. YELLOWSTONE NATIONAL PARK. Mammoth Hot Springs, 6,200 feet, *Burglehaus* in 1893, *NY, RM, Wash*, 6,600 feet, *Dewart* in 1889, *NY;* The Thundreer, *A. & E. Nelson 5817, RM*, photograph *Pom-B, NY*, photograph *Pom-B* (type and isotype of *R. Jovis*, cf. below). TETON CO. Double Diamond Ranch, Grand Teton National Park, *Williams & Peirson 1074, RM, Utah, CAS* (as *R. Peirson 1074*); Teton Pass, 9,500 feet, *L. Williams 783, NY, CAS, Utah, RM*. LINCOLN CO. Sheep Mountain (Ferry Peak), Snake River Range near Alpine, *Payson & Armstrong 3444, RM, Pom*.
UTAH: Common in the Bear River Range and the Wasatch Mountains as far south as Salt Lake County. SUMMIT CO. Gogorza, *Garret 2946, NY;* Kamas, *Ban* in 1914, *Pom*.

Type collections.—(1) *R. digitatus*, "Hab. in Rocky Mountains, near Fort Hall. Mr. Burke." Isotypes *NY* (2 sheets, 1 Columbia Univ.). (2) *R. Jovis*, "The type no. is 5817, collected on the Thunderer, Yellowstone Park, July 13, 1899 by Messrs. Elias Nelson & L. N. Goodding." According to the label, by *Aven Nelson and Elias Nelson*. Type, *RM 20395*, photograph *Pom-B;* isotype *NY*, photograph *Pom-B*.

61 RANUNCULUS GLABERRIMUS Hook.

Glabrous terrestrial perennials; roots large and fleshy, 2-3 mm. in diameter; stems prostrate or ascending, not rooting, 4-18 cm. long, 1-2 mm. in diameter, 1-6-flowered, not fistulous; basal leaf blades simple or rarely compound and dissected, orbicular to ovate, elliptic, or oblanceolate, or the blade dissected but deltoid to reniform in outline, 2-5 cm. long, 1-1.8 cm. broad, entire or 3- (or 5-) lobed at the apices or rarely dissected triternately into narrow divisions, thick, often blackening in drying, proximally rounded or tapered and distally rounded to acute, the petioles 3-9 cm. long, the stipular leaf bases usually 0.5, rarely 2 cm. long; cauline leaves and bracts alternate, 3-parted or -divided or rarely dissected, sessile; pedicels 1-4 cm. long in flower, 5-12 cm. long in fruit; sepals dorsally lavender-tinged, spreading, elliptic, 5-8 mm. long, 3-5 mm. broad, slightly pubescent dorsally, half or three-fifths the length of the petals, promptly deciduous; petals 5, or rarely more, yellow or in age turning white, obovate, 6-15 mm. long, 5-10 mm. broad, the nectary scale nearly always ciliate, forming a cuneate-rectangular pocket 1.5-3 mm. deep, truncate or 2-lobed, the apex sometimes free; stamens 40-60; achenes 75-150 in a large globose head 10-20 mm. in diameter, each achene irregularly obovoid, 2 mm. long, 1.5-1.6 mm. dorsoventrally, 1 mm. laterally, smooth, usually finely pubescent, the margin inconspicuous but winged along the short stalk at the base, the beak slender or flattened and a little winged, 0.6 mm. long, not recurved; receptacle globose, 2-3 mm. long in flower, 8-17 mm. long in fruit, glabrous.

61a RANUNCULUS GLABERRIMUS var. **typicus**, nom. nov.

R. glaberrimus Hook. Fl. Bor. Amer. 1: 12. *pl.* 5. *f. A.* 1829. *R. Austinae* Greene, Erythea 3: 44. 1895.

Basal leaf blades simple, orbicular to ovate or obovate, 2-3 cm. long, 1-1.8 cm. broad, usually 3- (or 5-) lobed at the apices, rarely entire, proximally rounded or tapering and distally rounded.

Sandy soil in the sagebrush region at 1,000 to 5,500 feet elevation; Sagebrush Desert and on the edge of the Plains Grassland. British Columbia and

the Columbia River Plateau and southward to Plumas County and Siskiyou County, California, and to Idaho and western Montana; northwestern Utah; Newell, South Dakota. April and May; the first flower of spring through much of its range.

An apetalous form has been collected with ordinary plants (Granite Point, Whitman County, Washington, *Pickett 214* in 1915, *WSC*) and in a separate colony (north of Ephrata, Grant County, Washington, *St. John 6005, WSC*).

Significant specimens.—BRITISH COLUMBIA: Vernon, Grand Forks, and Dry Valley, Yale and Canloo Districts, *Anderson 702, NR;* Lytton, *Macoun* in 1889, *Can;* Midway, *Spreadborough* in 1905, *Geol. Surv. Can. 69398, Can, NY;* Penticton, Lake Okanagan, *Spreadborough, Geol. Surv. Can. 59515, NY, 59519, Can.*

NEVADA: WASHOE CO. Verdi, *Sonne* in 1896, *Pom, NY, Hillman* in 1896, *Pom, RM;* Verdi to Dry Valley, *Sonne* in 1889, *HGr;* Marmol Station, *Heller 10385, NY, DS;* Thomas Creek, *Billings 1211, Clo;* Reno, *Hillman* in 1899, *Pom;* 5 miles southwest of Reno, *M. Canby 28* in 1929, *Pom.*

UTAH: BOXELDER CO. Blue Creek, *Rua Williams* in 1934, *RM, WSC.*

SOUTH DAKOTA: Newell, *Carr* in 1913, *NY, RM, Mo, GH* with 2 collections, Apr. 20 and May 1.

Type collections.—(1) *R. glaberrimus*, "Common on the mountains around the Kettle Falls [Columbia River in Washington] and on the Rocky Mountains near the limits of perpetual snow. *Douglas.*" The Kettle Falls specimen has been designated as a lectotype, cf. L. Benson, Bull. Torrey Club 68: 658. 1941. Topotype, 2 miles southeast of the Kettle Falls, *H. T. Rogers 344, Pom, Pom-B, CAS, Clo, Utah.* (2) *R. Austinae*, "Crevices of lava rock east of Willow Creek Valley [Modoc County] in Northern California, Mrs. R. M. Austin, 1894. Species evidently allied to *R. glaberrimus*, though very distinct by its slender habit, snow-white petals, and elongated head of achenes." Type, *HGr;* isotypes *UC, Pom-B 268692, NY, US 1466016, PA 716282.* The petals of *R. glaberrimus*, like those of many other *Ranunculi*, turn white when they wither. The habit and head of achenes are normal for *R. glaberrimus.* A review of the Herbarium Greeneanum in 1935 failed to reveal the type specimen.

61b RANUNCULUS GLABERRIMUS var. ELLIPTICUS Greene, Fl. Fran. 1: 298. 1892

R. ellipticus Greene, Pittonia 2: 110. 1890. *R. Waldronii* Lunell, Amer. Midl. Nat. 3: 12. 1913.

Basal leaves entire, elliptic or oblanceolate, 3-5 cm. long, tapering into the petioles, 3-5 cm. long; upper cauline leaves with the middle division elongated.

Mountain meadows and the edge of the Great Plains at 4,500 to 9,000 feet elevation; Rocky Mountain Montane Forests and sparingly in the Sierran Montane Forest and the Plains Grassland. Lytton, British Columbia, to the Great Basin and Rocky Mountains and to Mono County, California, western Montana, southwestern North Dakota, western South Dakota, Nebraska, and Rio Arriba County, New Mexico. Apil to June.

Significant specimens.—BRITISH COLUMBIA: Lytton, *Macoun* in 1889, *NY* (possibly though var. *typicus*, cf. citations under that variety); Lake Bootahnie, Marble Mountains, 5,000 feet, *J. W. & E. M. Thompson 69, Pom-B, Wash.*

WASHINGTON: *Brandegee 611* in 1883, *GH.* OKANOGAN CO. Rock Mountain, 7,300 feet, *Fiker 1280, Pom-B, WSC, Wash;* Tunk Mountain, *Otis 518* in 1911, *WSC, GH* (cauline leaves entire). PIERCE CO. Camp 6, Mt. Rainier Forest Reserve, *Flett* in 1899, *NR.* KITTITAS CO. Six miles south of Cle Elum, *G. N. Jones* in 1933, *Pom-B, Ill* (intergrade). YAKIMA CO. Cleman Mountain 20 miles northwest of Yakima,

J. W. Thompson 14496, GH. KLICKITAT CO. High hills near Bickelton, *Howell* in 1882, *UO;* Goldendale, *Suksdorf 7194, WSC;* Bingen, *Suksdorf 11275, WSC,* southwest corner of the County, *Suksdorf 1968, WSC.* PEND OREILLE CO. Newport, *Spiegleberg 118* in 1923, *RM, 119* in 1923, *RM.* SPOKANE CO. Waverly, *Suksdorf 2631, WSC,* Spangle, *Suksdorf 11261, WSC.* WALLA WALLA CO. (?). Military Road from Walla Walla to Ft. Benton, Hell Gate, *Mullen 817, NY.* GARFIELD CO. Pomeroy, Blue Mountains, *Hitchcock & Muhlick 8296, Wash, Pom-B, CAS;* Blue Mountains (county not given), *Horner* in 1897, *US, GH.*

OREGON: Clear Water, *Rev. Spaulding, GH.* CROOK CO. Hulett, *Ownbey 525, Wash;* Powell Butte, *Detling 2621, Wash 2624, WSC.* UNION CO. Catherine Creek, near Union, *J. W. Thompson 11331, Wash, Pom-B, DS, US, Mo;* East Eagle Creek, Wallowa Mountains, *Cusick 3168, DS, Mo, UO.* WALLOWA CO. Bald Knob (Mt.), *Jardine 23, US, Sampson & Pearson 36, US;* Billy Meadows (Wallowa Co.?), *Jardine 188, US.* KLAMATH CO. Swan Lake, *Applegate 6a* in 1896, *DS, Mo.* LAKE CO. Honey Creek, *Loveless 89* in 1931, *PA.* HARNEY CO. Steen Mountains. Above Wildhorse Creek, *Applegate 5673, DS, Wash, 5674, DS, 5677, DS;* northwest of Fish Lake, *Maguire & Holmgren 26462* in 1946, *Pom.* MALHEUR CO. Head of Dry Creek, *Leiberg 2152, GH, US.*

CALIFORNIA: Dry Valley, *Sonne* in 1889, *NR;* Sierra Nevada, *Lemmon* in 1875, *NR, PA.* MODOC CO. Camp Bidwell, *Matthews* in 1879, *GH.* LASSEN CO. Austin in 1874, *GH.* NEVADA CO. Norden, west side of Donner Pass, *Jorgensen 442* in 1944, *CAS, Pom-B, DS* (most cauline leaves entire); Donner Lake, *Sonne* in 1886, *HGr* (lectotype, cf. below); Truckee, *Sonne 4* in 1884, *UC 192880* (2 plants with entire cauline leaves), in 1891, *UC, Pom-B, Mo,* in 1897, *UC.* MONO CO. Virginia Lakes (possibly Fresno Co.), *Cantelow* in 1941, *CAS.*

NEW MEXICO: RIO ARRIBA CO. Tierra Amarilla *Eggleston 6459, GH, NY;* Willow Creek, *Eggleston 6438, NY.*

NORTH DAKOTA: Dickinson, *Waldron* in 1912, *HGr,* photograph *Pom-B* (type of *R. Waldronii,* cf. below).

SOUTH DAKOTA: Horse Creek, *Carr 300, NY.* Crook Mountain Ranger Station, Black Hills, *Murdoch 3502, NY, GH.* LAWRENCE CO. Spearfish, *M. A. Tohmpson,* Apr. 24, *Ill.*

NEBRASKA: Grindstone Hill, 100 miles west of Fort Pierre, *F. V. Hayden* in 1855, *Mo.*

Type collections.—(1) *R. ellipticus,* "Lower and Middle mountain districts of Colorado, Utah and Nevada to eastern California." Since in the Herbarium Greeneanum there is only one Californian collection but several possibilities from each other state, the writer has proposed the following as a lectotype, cf. Bull. Torrey Club 68: 659. 1941: Wet gravelly ground on road to Donner Lake [from Truckee] *C. F. Sonne,* May 16, 1886, *HGr 2583.* (2) *R. Waldronii,* "The type was collected on May 14, 1912 in a moist pasture at Dickinson, Stark County, in the southwestern part of this state [North Dakota] . . . named in honor of its first collector, Mr. Clarence H. Waldron. . . ." Type, *Minn 257685,* photograph *Pom-B.*

61c RANUNCULUS GLABERRIMUS var. RECONDITUS (Nels & Macbr.)

L. Benson, Amer. Jour. Bot. 23: 170. 1936
(Liberal policy: *R. reconditus* Nels. & Macbr.)

R. triternatus A. Gray, Proc. Amer. Acad. 21: 370. 1886. *R. reconditus* Nels. & Macbr. Bot. Gaz. 56: 473. 1913.

Basal leaves finely dissected, triternately-parted or -divided, the primary divisions long-petiolulate and the secondary and finer divisions filiform-linear to linear-spatulate, obtuse, the dissected blade deltoid to reniform in outline, 3-4 cm. long, 3-5 cm. broad; cauline leaves similar to the basal.

Vernally moist slopes at 3,000 to 4,000 feet elevation; Sierran Montane

Forest. Klickitat County, Washington, and near the Dalles, Oregon; a similar form northwest of Elko, Nevada. April and May.

Specimens examined.—WASHINGTON: KLICKITAT CO. Hills near Goldendale, *Howell* in 1882, *GH, DS, NY, US, UO* (type and isotypes, cf. below), in 1888, *UO*, in 1894, *UO, Howell 10* in 1895, *UC, UO;* southwest of Goldendale, *J. W. Thompson 11415, Wash, Pom, Pom-B, UC, CAS, US, WSC, GH, RM, Mo, Clo;* "High sagebrush hills," Centerville, *J. W. Thompson 14272, CAS, Wash, Mo, US;* High prairies, Klickitat, *Howell* in 1880, *Mo;* Klickitat Valley, *Howell* in 1878, *GH* (leaves a little less dissected); Rockland, *Suksdorf* in 1900, *WSC;* opposite The Dalles, *N. P. Gale, Wash, Hitchcock & Marsh 3307, CAS, DS, Wash.*

OREGON: WASCO CO. Roadside near The Dalles, *Howell* in 1880, *UO;* Grand Dalles, *Gorman* in 1895, *UO.*

NEVADA: The following plant approaches this variety, but the leaves are somewhat less divided: ELKO CO. 18 miles northwest of Elko, summit of Mountain road cut-off, 5,660 feet, *Nichols & Lund 8*, May 13, 1937, *USNA.*

Type collection.—"Klickitat Co., Washington Terr., on high hills near Goldendale, Howell, by whom it has been distributed under the name of *R. Hookeri.*" April 20, 1882. Type, *GH*, photograph *Pom-B;* isotypes, *DS 97474, NY, US 1010, UO.*

Sect. 4 FLAMMULA (Webb) Ruoy & Foucaud

Flammula, as subgenus, Webb in Spach, Hist. Nat. Veg. 7: 208. 1839.

Flammula, as genus, Fourr. Ann. Soc. Linn. Lyon. II. 16: 324. 1868.

Flammula, as section, Ruoy & Foucaud, Fl. France 1: 82. 1893.

Flammula, as section, L. Benson, Amer. Jour. Bot. 23: 171. 1936.

Glabrous or sometimes hairy terrestrial, palustrine, or aquatic annuals or perennials. Basal and cauline leaves entire or dentate, serrulate, or undulate. Sepals yellow or greenish-yellow, spreading. Petals 5 or sometimes 1-3 or 10, yellow; the nectary-scale glabrous or rarely ciliate, truncate or lobed, forming a pocket. Achenes 6-50 in a capitate cluster or sometimes the head cylindroid, each obovoid, the dorsoventral measurement about twice or thrice the lateral; the pericarp smooth or rarely papillate, glabrous or sometimes pubescent; styles present, the achenes beaked. Receptacle but slightly enlarged in fruit.

Type species, *Ranunculus Flammula* L.

KEY TO THE SPECIES

1. Sepals 5 (3 in *R. alveolatus*); beak of the achene produced from the ventral side of the apex of the body; flowers produced at the apex of the stem, actually sympodial, but the sympodium not elongated and with the lower portion of the stem differentiated from the flower-bearing portion.

2. Perennials; achenes 1.2-3.2 mm. long, the beaks 0.3-1.5 mm. long or in *R. Flammula* var. *typicus* 0.1-0.2 mm. long; petals 5-10, conspicuous and usually large, longer than the sepals except in *R. oresterus.* (The *Ranunculus Flammula* group.)

3. Achenes 3-3.2 mm. long, puberulent at least basally, each with a flat, winged stalk; receptacle usually short-pubescent; nectary scale usually ciliate along the distal margin, the adjacent surface of the petal usually with some

* Cf. data on expansion of petals during anthesis under *R. macranthus*, pp. 104-5.

hairs; stems scapose. (Southern Utah and Northern Arizona; northern New Mexico.) ..... 62. *R. oreogenes.*

3. Achenes 1.2-2.5 mm. long, not usually with winged stalks, glabrous except in *R. alismaefolius* var. *Lemmonii*, receptacle glabrous except sometimes in *R. Populago;* nectary scale and the surface of the petal glabrous; stems usually not scapose.

4. Roots not with light-colored, fusiform, thickened storage regions at the bases.

5. Stems never rooting.

6. Roots glabrous in their mature portions; the petals 6-16 mm. long, 3-8 mm. broad, exceeding the sepals, obovate or in var. *montanus*, which has almost always 10 petals, oblanceolate or narrowly oblong and 2-3 mm. broad; basal leaf *not* broadest at the middle and tapering to the acute ends. (British Columbia and Western States.) ..... 63. *R. alismaefolius.*

6. Roots densely and finely canescent their whole length; petals not exceeding the sepals, narrowly oblong, 3-5 mm. long, 1-2 mm. broad, always 5; basal leaf broadest at the middle and tapering to the acute ends. (Eastern Oregon and Central Idaho.) ..... 64. *R. oresterus.*

5. Stems rooting at at least the lower nodes (rarely not rooting but with the capacity for rooting in typical *R. Flammula*, which is restricted to Newfoundland and Nova Scotia.)

6. Achene body about 2 mm. long, nearly rectangular, the beak 1.1-1.3 mm. long; stem 5-10 dm. long, 5-8 mm. in diameter at the base, rooting at only the lower nodes, the distal portion ascending. (Middle West and East.) ..... 65. *R. ambigens.*

6. Achene body 1.3-1.7 mm. long, obovate, the beak 0.1-0.8 mm. long.

7. Achene beak 0.2-0.5 or sometimes 0.6 or rarely 0.7 mm. long, the stigmatic surface mostly across the broad apex of the style, the beaks approaching the type in *R. hydrocharoides* in some forms of vars. *ovalis* and *filiformis*, but these varieties distinguished from *R. hydrocharoides* var. *typicus* by the linear to oblanceolate or lanceolate instead of ovate, cordate, or elliptic basal leaves, cf. discussion under *R. hydrocharoides.* (Old World; Alaska and Iceland to the United States.) ..... 66. *R. Flammula.*

7. Achene beak 0.8-1 mm. long, the stigmatic portion long-attenuate. (Southeastern California to western New Mexico and Guatemala.) ..... 67. *R. hydrocharoides.*

4. Roots each with a small, light-colored, fusiform-thickened storage region at the base, this structure 1-2 mm. in diameter.

5. Stems rooting at the nodes; leaves alternate, the flowers never in cymes. (Oregon to Northern California.) ..... 68. *R. Gormanii.*

5. Stems never rooting.

6. Basal leaf blades or most of them broadly rounded, truncate, or cordate at the bases; stems 2-5- or mostly 6-10-flowered, the cauline leaves usually opposite and the flowers in true cymes. (Eastern Oregon to Idaho.) ..... 69. *R. Populago.*

6. Basal leaf blades or all but 1 or 2 of them acute at the bases. ..... 60C & E. *R. alismaefolius* vars.

2. Annuals; achenes 0.6-1 or rarely 1.5 mm. long, the beaks 0.1-0.2 mm. long. (The *Ranunculus pusillus* group.)

3. Petals 5-9, large and conspicuous, about twice as long as the sepals; styles

in anthesis 0.5 mm. long, filiform, deciduous in fruit; head of achenes hemispheroidal or ovoid. (Southeastern United States.) .....70. *R. texenis.*

3. Petals 1-3, minute and inconspicuous, shorter than or equal to the sepals; styles in anthesis 0.1-0.2 mm. long.

4. Sepals 5; upper cauline leaves linear to lanceolate or oblanceolate or very narrowly elliptic, sessile; achenes oblong-obovate, 0.6-1 mm. long, smooth, reticulate, or papillate, the units of the reticulate pattern perhaps 0.03 mm. in diameter when visible. (California; Southeastern United States.) .....71 *R. pusillus.*

4. Sepals 3; upper cauline leaves ovate, petioled; achenes obovate, about 1.5 mm. long, reticulate, the units of the pattern about 0.1 mm. in diameter. (Northern California.) .....72. *R. alveolatus.*

1. Sepals 3-4; beak of the achene produced from the apex of the elliptic-acute achene, 0.5-0.6 mm. long; flowers produced opposite the cordate or cordate-ovate leaves for a considerable distance along the "stem" (sympodium). Mexico to South America.) (The *Ranunculus flagelliformis* group.) .....
.....73. *R. flagelliformis.*

62 RANUNCULUS OREOGENES Greene, Pl. Baker 3: 2. 1901

R. Collomae L. Benson, Bull. Torrey Club 69: 299. 1942.

Glabrous terrestrial perennials; roots 6-10, remarkably stout, 2-3 mm. in diameter; stems scapose, prostrate or ascending, not rooting, 3-5 cm. long up to the lowest pedicel, 1.5-2.5 mm. in diameter, 1-3-flowered; basal leaf blades simple, oblanceolate to obovate, 2.5-6 cm. long, 0.8-1.5 or 2 cm. broad, entire, proximally attenuate and distally acute, the petioles 2.5-3.5 cm. long, the stipular leaf bases 1-1.5 cm. long; cauline leaves 1-3, opposite or alternate, lanceolate to oblanceolate, sessile; pedicels 2-5.5 cm. long in flower, 6-10 cm. long in fruit, glabrous; sepals 5, yellowish-green tinged with purple, spreading, elliptic, 5 mm. long, 3 mm. broad, pilose dorsally, about half the length of the petals, promptly deciduous; petals 5, yellow, obovate, 7-12 or 15 mm. long, 5-7 or 13 mm. broad, the nectary scale forming a pocket, broadly oblong, usually ciliate on the distal margin; stamens about 40-50; achenes 50-100 in an ovoid head 10-12 mm. long and 9-10 mm. in diameter, each achene obovoid, 3-3.2 mm. long, 2-2.2 mm. dorsoventrally, 1-1.2 mm. laterally, smooth, finely pubescent at least basally, the margin conspicuous, the beak slender, 1 mm. long, apically curved or recurved; receptacle ovoid-cylindroid, 1-2 mm. long in flower, 8-9.5 mm. long in fruit, finely pubescent.

Open dry ground under yellow pines at 7,000-8,000 feet elevation; Rocky Mountain Montane Forest. Southern Utah; Coconino County, Arizona; Rio Arriba County, New Mexico. February to April.

Specimens examined.—UTAH: Southern Utah, *Siler 37* in 1874, *GH, Mo.* KANE CO. Bryce Canyon, *Rodd* in 1923, UC (nectary scale glabrous). SAN JUAN CO. 20 miles west of Blanding, Abajo Mountains, *Harrison & Williams 5894, UA, Utah.*

ARIZONA: COCONINO CO. Jacobs Lake, Kaibab Forest, *Maguire 13550* in 1936, *UA, GH, Utah;* North Rim, Grand Canyon, *McHenry* (*pl* [ant] *500*) in 1933, *GCNP* (nectary scale glabrous; receptacle with few fine hairs), *2076* (same characters); VT Ranch, Kaibab Forest, *Mann* in 1929, *Utah, Pom* (collection with mature fruit), *Collom* May 31, 1945, *GCNP;* Greenland Lake, North Rim Grand Canyon, *Bryant* in 1945, *GCNP;* South Rim of Grand Canyon at Bugglen (Buglan) Hill, *Collom BHI,* May 8, 1940, *US, PA, GCNP* (best fruiting collection) *999,* April 10, 1941, *GCNP, UA, GCNP, Pom-B, PA* (type and isotype, cf. below); 1½ miles north

of Foxburrow (Foxburough) Ranch, on Schnably Hill Road, Oak Creek Canyon, *Wetherill I* April 7, 1940, UA, MNA, Pom-B; Shore of Rogers Lake, *Whiting Cat. No. 1112/5671, Pom-B;* North Shore of Lake Mary, *Whiting Cat. No. 1053/5512, Pom-B;* Arizona Highway 79 one mile north of Oak Creek Canyon, *Deaver 908, Clo.*

COLORADO: Cerro Summit above Cimarron, *C. F. Baker* in 1901, *HGr.* photograph *Pom,* (type of *R. oreogenes,* cf. below).

NEW MEXICO: RIO ARRIBA CO. Tierra Amarrilla, *Eggleston 6459, Mo.*

The species shows relationship to *Ranunculus glaberrimus* Hook. var. *ellipticus* Greene, and in some respects it is a connecting link between the sections *Epirotes* and *Flammula,* although it is clearly in the latter section. The following characters show relationship to var. *ellipticus:* (1) presence of only 6-10 large, coarse roots, (2) habitat in dry soil, (3) pubescent achenes, (4) winged stipe of the achene, (5) usually ciliate nectary scale (ciliate or glabrous in *R. glaberrimus*). Only five species of *Ranunculus* occurring definitely in Noth America have ciliate nectary scales. They are *R. cardiophyllus, R. arizonicus, R. Forreri,* and *R. glaberrimus* in the section *Epirotes and R. oreogenes.* This character occurs sometimes in *R. aur.comus,* however. *R. oreogones* is most closely related to *R. alismaefolius* Geyer. var. *Lemmonii* (A. Gray) L. Benson.

Type collections.—(1) *R. oreogenes,* ". . . at Cerro Summit above Cimarron, 7 June, no. 50," *C. F. Baker.* Only a few late fruiting plants were collected, and these were sent to Greene. Type, *HGr 2430,* photograph *Pom,* supplied through the kindness of Dr. John D. Mizelle. (2) *R. Collomae,* ". . . near Bugglen (Buglan) Hill, South Rim of the Grand Canyon, Coconino County, Arizona: coll. April 10, 1941, *Mrs. Rose E. Collom 999.* TYPE in the Herbarium of the University of Arizona. ISOTYPE, *B [Pom-B].*" Type, *UA;* isotypes, *Pom-B 268471, GCNP, PA 811191.*

TABLE 10.—*Ranunculus oreogenes, R. alismaefolius,* and *R. glaberrimus* Var. *ellipticus.*

R. oreogenes	*R. alismaefolius*	*R. glaberrimus* var. *ellipticus*
Roots 6-10, stout and coarse, not tuberous, conspicuous in dried specimens.	Roots usually 15-30 except in var. *alismellus,* which has small, somewhat tuberous roots.	Roots 6-12 or 14, stout and coarse, not tuberous, conspicuous in dried specimens.
Basal and cauline leaves entire.	Basal and cauline leaves entire.	Basal leaves entire; cauline leaves parted.
Nectary scale usually ciliate, the adjacent surface of the petal usually pubescent.	Nectary scale and the petal glabrous.	Nectary scale nearly always ciliate, the adjacent surface of the petals sometimes pubescent.
Achenes 80-120, pubescent at least at the bases, 3.5 mm. long, with winged bases.	Achenes 10-50, glabrous except usually in var. *Lemmonii,* 1.5-2.5 mm. long, the bases not winged.	Achenes 75-150, usually canescent and perhaps always so, 2 mm. long, the bases winged.
Receptacle short-pubescent, the hairs sometimes very sparse, ovoid.	Receptacle glabrous, ovoid.	Receptacle glabrous, globose.

63 RANUNCULUS ALISMAEFOLIUS Geyer

Glabrous or rarely pilose terrestrial or almost palustrine perennials; roots 6-12 or usually 15-30, slender or sometimes slightly tuberous at the bases, about 1.5-2 mm. in diameter; stems erect to decumbent, not rooting, 1-8 dm. long, 1-6 mm. in diameter, unbranched to rather freely-branching above, fistulous; basal leaf blades simple, lanceolate, 2-12 cm. long, 1-3 cm. broad, entire or often serrulate, thick, proximally tapering into the petiole and distally usually acute, petioles 5-18 cm. long, stipular leaf bases 2-6 cm. long; cauline leaves alternate below, usually few, the bracts often opposite, lanceolate, sessile; pedicels 1-6 cm. long in flower, 3-11 cm. long in fruit, glabrous or thinly appressed-hairy; sepals 5, yellowish-green, spreading, narrowly elliptic, 3-5 mm. long, about 2 mm. broad, pubescent dorsally or glabrous, about one-third or two-fifths the length of the petals, promptly deciduous; petals 5, yellow, obovate, 5-10 mm. long, about 2-5 mm. broad, the nectary scale forming a pocket, the distal half often free; stamens about 30-80; achenes 10-50 in a hemispheroid to subglobose head 4-7 mm. long and 4-8 mm. in diameter, each achene cuneate-obovate, 1.5-2.5 mm. long, 1.3-1.7 mm. dorsoventrally, 0.7-1 mm. laterally, smooth, glabrous, or rarely pubescent, the margin inconspicuous, the beak slender but thick at the base, 0.6-0.9 mm. long, not recurved; receptacle pyriform, 1-2 mm. long in flower, 1-5 mm. long in fruit, glabrous.

KEY TO THE VARIETIES

1. Petals 5, obovate, or usually narrowly so in var. *Davisii*.
   2. Receptacle elongated by 3-5 mm. in fruit, pyriform; stems 3-8 dm. long; leaves lanceolate, often serrulate; roots not tuberous ..... 63A. Var. *typicus*.
   2. Receptacle elongated by 1 or 2 mm. (rarely more) in fruit; stems 1-4 dm. long; leaves entire.
      3. Achenes glabrous; herbage glabrous.
         4. Petals about 10 mm. long; roots usually not clearly tuberous-thickened at the bases ..... 63B. Var. *Hartwegii*
         4. Petals usually about 4-7 mm. long; roots somewhat (minutely) tuberous-thickened at the bases.
            5. Leaves lanceolate, the petioles usually appressed-hirsute; stems mostly 3- or up ot 7-flowered, 2.5-3.5 dm. high ..... 63D. Var. *Davisii*.
            5. Leaves ovate or ovate-lanceolate or rarely lanceolate, the petioles glabrous; stems 1- or 2- or rarely 3-flowered ..... 63E. Var. *alismellus*.
      3. Achenes pubescent or glabrate; herbage pilose or glabrous; petals 8-16 mm. long; leaves lanceolate ..... 63C. Var. *Lemmonii*
1. Petals 10 or rarely 5-9, oblanceolate or sometimes broadly so; roots sometimes tuberous-thickened at the bases ..... 63F. Var. *montanus*.

63a RANUNCULUS ALISMAEFOLIUS var. **typicus**, nom. nov.*

R. alismaefolius Geyer ex Benth. Pl. Hartw. 295. 1848. *R. Bolanderi* Greene, Bull. Calif. Acad. 2: 58. 1886. *R. Flammula alismifolius* Clements & Clements, Rocky Mt. Fls. 6. 1914, nom. nud., probably using the name of *R. alismaefolius* with modification for var. *montanus*.

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* Cf. Table 11.

TABLE 11.—Varieties of *Ranunculus alismaefolius* Geyer.

Var. *typicus*	Var. *Hartwegii*	Var. *Lemmonii*	Var. *Davisii*	Var. *alismellus*	Var. *montanus*
Glabrous.	Glabrous.	Commonly pilose at least on the stems and petioles.	Usually appressed hirsute (stem-bases and often petioles).	Glabrous.	Glabrous.
Roots usually 15-30, tapering gradually.	Roots mostly 10-25, tapering gradually, usually not clearly thickened at the bases.	Roots mostly 12-30, tapering gradually.	Roots mostly 6-10, each with a light-colored fusiform thickening at the base.	Roots 6-12, each with a light-colored fusiform thickening at the base.	Roots mostly 12-30, tapering gradually or sometimes thickened at the bases.
Stems erect, 3-8 dm. long, mostly 4-6 mm. in diameter, rather freely branching above, fistulous, with several to many flowers.	Stems suberect or reclining below, 2-4 dm. long, 1.5-2.5 mm. in diameter, branching above, several-flowered.	Stems decumbent, 1.5-3 dm. long, 1.5-3 mm. in diameter, branching below, several-flowered.	Stems suberect or reclining, 1.5-2 or 2.5 dm. long, mostly 1 mm. in diameter, subscapose, not fistulous, mostly 3- or up to 7-flowered.	Stems suberect or reclining, 1-2 or 3 dm. long, 1-1.5 mm. in diameter, branching below, several-flowered.	Stems 2-3 or 4 dm. long, 1.5-4 or rarely up to 10 mm. in diameter, branching above, several-flowered. the cauline leaves often opposite and the flowers cymose.
Basal leaf blades lanceolate, 4-12 cm. long, 1-3 cm. broad, entire or serrulate, thick, tapering into the broad petiole.	Basal leaf blades lanceolate, 3-7 or 8 cm. long, 5-10 mm. broad, entire, of intermediate thickness, tapering into the broad petiole.	Basal leaf blades lanceolate, 3-9 cm. long, 5-10 mm. broad, entire, of intermediate thickness, tapering into the broad petiole.	Basal leaf blades perfectly lanceolate, 3-5 cm. long, 4-15 mm. broad, entire, thin but firm, not tapering into the slender petioles.	Basal leaf blades ovate-lanceolate or sometimes ovate, 2-4 cm. long, 4-10 mm. broad, entire, thin, usually not tapering into the broad petiole.	Basal leaf blades narrowly elliptic, 2-6 cm. long, 1-2.5 cm. broad, entire, of intermediate thickness, tapering into the broad petiole.

TABLE 11.—(*Continued.*)

Var. *typicus*	Var. *Hartwegii*	Var. *Lemmonii*	Var. *Davisii*	Var. *alismellus*	Var. *montanus*
Petals 5, obovate, about 10 mm. long, the nectary scale free on the distal half.	Petals 5, obovate, 6-8 mm. long, the nectary scale attached almost to the apex.	Petals 5, obovate, 8-16 (mostly 10) mm. long, the nectary scale free on the distal half.	Petals 5, obovate or narrowly so, 4-7 mm. long, the nectary scale somewhat prolonged on the attached margins.	Petals 5, obovate, about 6 mm. long the nectary scale attached usually almost to the apex.	Petals 10 or rarely 5-9, usually oblanceolate, 5 or commonly 7-12 mm. long, only 2-3 or rarely 5 mm. broad, the nectary scale free on the distal half or third.
Achenes 30-50, about 2.5 mm. long, glabrous.	Achenes 20-30, about 2 mm. long, glabrous.	Achenes about 20, about 2 mm. long, pubescent, glabrate, or sometimes glabrous.	Achenes 7-15, about 1.5 mm. long, glabrous.	Achenes 10-30, about 1.5 mm. long, glabrous.	Achenes 25-60, about 2 mm. long, glabrous.
Receptacle about 4-5 mm. long in fruit.	Receptacle 1-1.5 mm. long in fruit.	Receptacle about 2-5 mm. long in fruit.	Receptacle about 1 mm. long in fruit.	Receptacle about 1 mm. long in fruit.	Receptacle 2-3 mm. long in fruit.
Vancouver Island; south and east borders of Washington; western Oregon and the Wallowa Mountains; northeastern California.	Central Washington to Lake and Fresno counties, California; rare in Idaho and perhaps Wyoming and northeastern Nevada; west-central Nevada.	Modoc County to Truckee, California.	Eastern Oregon to western Montana and western Wyoming.	Rare and mostly modified in central and south-central Washington; mostly Californian; western edge of Nevada.	Bingham County, Idaho and the Ruby Mountains, Nevada, to western and southern Wyoming, Utah, and Colorado.

Muddy lake borders and ditches at low elevations in the coastal region and up to 3,000 or 5,000 feet inland; Pacific Forest and Palouse Prairie. Vancouver Island, British Columbia; Lewis, Kittitas, and Klickitat counties and the eastern border of Washington; Wallowa Mountains, Eastern Oregon, and from the Willamette Valley to the Seaward North Coast Ranges as far south as Mendocino County, California; rare and tending toward var. *Hartwegii* in Plumas and Sierra counties, California; northern Idaho; Blackfoot Valley, Montana. May and June.

Significant specimens.—BRITISH COLUMBIA: Victoria, *W. R. Carter* in 1915, *Pcm*, in 1918, *UC*, in 1918-19, *UC*, *Newcombe* in 1919, *WSC;* Oak Bay, Victoria, *Macoun* in 1887, *Can*, *GH*, *Gardner* in 1910, *UC*, *RM*, *J. R. Anderson* in 1919, *WSC*. WASHINGTON: East of the Cascade Mountains, *Wilkes Exped. 474*, *US*. LEWIS CO. Napavine, *J. W. Thompson 869*, *DS*, *Mo*, *Wash*. KITTITAS CO. Colockum Pass, *H. W. Smith 1216*, *Wash*. KLICKITAT CO. *Suksdorf* in 1878, *GH;* Gilmer, *Suksdorf 6998*, *WSC;* Hawk Prairie, *Suksdorf* in 1900, *WSC;* Falcon Valley, Mt. Adams. *Suksdorf* in 1883, *DS*, *457*, *WSC*, *6599*, *WSC*, *10879*, *DS*, *UC*, *CAS*, *Ill*, *GH*. OREGON: Common in and near the Willamette Valley. DOUGLAS CO. Cales or Coles (?) Valley, *Cusick 3987*, *UO*. BAKER CO. Bald Knob, Wallowa Mountains, *Sampson & Pearson 36a*, *US*. CALIFORNIA: Not uncommon in Humboldt and Mendocino counties. PLUMAS CO. *Austin* in 1874, *GH;* Prattville, *M. E. Jones* in 1897, *Pom* (tending toward var. *Hartwegii*), *Heller & Kennedy 8792*, *GH* (and other herbaria not recorded, some of the duplicates perhaps approaching var. *Hartwegii*). SIERRA CO. Sierra Valley, *Lemmon* in 1877, *GH*. IDAHO: Common in northern Idaho. BLAINE CO. Outlet of Alturas Lake, Sawtooth Mountains, *Evermann 595*, *DS*. MONTANA: Blackfoot Valley east of Missoula, *F. H. Rose 160* in 1935, *WSC*.

Type collections.—(1) *R. alismaefolius*, ". . . Geyerianis e montibus scopulosis. . . ." "High grassy plains of Couer d' Aleine. [*Geyer*] (n. 306), Idaho, cf. Hook. London Jour. Bot. 6: 66. 1847. Isotypes, *DS 167836*, *GH*, photograph *Pom-B*. (2) *R. Bolanderi*, "Long Valley, Mendocino County [California], May, 1886, H. N. Bolander, No. 4730." Type, *HGr 2409;* isotypes, *GH*, photograph *Pom-B*, *US 320366*, *Pom-B 268687*, *CAS 1041* (new number) or *1297* (pre-earthquake number), *UC 9390*. (3) *R. flammula alismifolius, nomen nudum*, referred here because of the similarity of the names *alismifolius* and *alismaefolius*, although the authors must have had in mind *Ranunculus alismaefolius* var. *montanus*, since it is the only variety occurring in the range covered in the book.

63b RANUNCULUS ALISMAEFOLIUS var. HARTWEGII (Greene) Jepson,* Fl. Calif. 1: 534. 1922 (Moderate policy: var. of *R. Lemmonii*. Liberal policy: *R. Hartwegii* Greene)

R. alismaefolius var. *caule petiolisque basi hirsutis* Benth. Pl. Hartw. 295. 1848. *R. Hartwegii* Greene, Erythea 3: 45. 1895. *R. arnoglossus* Greene, Pittonia 4: 143. 1900.

Mountain meadows at 4,500 to 7,000 feet elevation; Sierran Montane Forest and sparingly in the Rocky Mountain Montane Forest. Cascade Mountains of central Washington to California as far south as northern Lake and Fresno counties and to southern Idaho; southern Washoe, Ormsby, Elko, and White Pine counties, Nevada; possibly Yellowstone National Park and Teton County, Wyoming. Occurring in the Oregon Cascades mostly as an intergrade toward var. *alismellus*. May and June.

* Cf. Table 11.

Significant specimens.—WASHINGTON: Alpine Pond, Case Mountains, *Henderson 2370* in 1892, *GH*. CHELAN CO. (?) Wenatchee Mountains, *Cotton 1183*, *RM* (tending toward var. *alismellus*). KITTITAS CO. Colockum Pass, *H. W. Smith 1216*, *WSC*; Bald Mountain, *J. W. Thompson 14763*, *Wash*, *Pom-B*, *CAS*, *DS*, *Mo*, *GH* (this duplicate tending toward var. *alismellus*). YAKIMA CO. Dry Creek, *Heidenreich 248* in 1932, *WSC*; Yakima Region, *Brandegee 1529h or 197* in 1882, *Mo*; Mt. Adams, *Suksdorf 719*, *WSC*, *4236*, *WSC*; Falcon Valley, *Suksdorf* in 1913, *WSC*, *7232*, *GH*, *Pom-B*, *WSC*, *7828*, *WSC*.

OREGON: Occasional in the Cascade Mountains and the mountains of Eastern Oregon.

CALIFORNIA: Only southern end of range cited. LAKE CO. Snow Mountain, *Brandegee* in 1891, *GH*, *M. S. Baker 3499a*, *UC*, *3499c*, *UC*. ALPINE CO. Woods Lake Region, *Peirson* in 1935, *Peirson 11623*. CALAVERAS CO. Calaveras Big Trees, *J. Ball* in 1884, *NR*, *GH*, *Mo*, *McCalla 3250*, *Pom-B*; Camp Baxter, North Fork Stanislaus River, *Jussel* in 1930, *CAS*. TUOLUMNE CO. Upper Cow Creek, *Quick 1967*, *CAS*. FRESNO CO. Vermilion Valley, *Klyver* in 1926, *DS*.

IDAHO: Boulder Lake, *Boone & Tucker* in 1933, *RM*; Sawtooth National Forest, *Woods* in 1910, *RM*. ADAMS CO. Payette Lake, *Beinke* in 1938, *WSC*; Weiser National Forest, *McCain* (?) in 1913, *RM*; 6 miles west of McCall (Valley Co. line), *F. G. Meyer 1478*, *GH*, *WSC*, *Mo*, between Starkey and New Meadows, *Cronquist 1198*, *WSC*. VALLEY CO. Bear Valley, *Hitchcock & Muhlick 9695*, *Pom-B* (tending to var. *Davisii*). BOISE CO. Banks, *Tucker* in 1938, *ISB*, *Pom-B*. CUSTER CO. Stanley Creek Enclosure, Challis National Forest, *Markle* in 1931, *Utah*; Between Starkey and New Meadows, *Cronquist 1198*, *Utah*. CASSIA CO. Mt. Harrison, *R. J. Davis 1286*, *Clo*, *Utah*, *ISB*.

NEVADA: Common near the Sierra Nevada in southern Washoe and Ormsby counties. ELKO CO. Ruby (East Humboldt) Mountains, *S. Watson* in 1868, *GH*, *Greene* in 1889, *HGr* (type of *R. arnoglossus*, cf. below), *M. E. Jones* in 1897, *Pom* (approaching var. *Davisii* and perhaps that variety but also near var. *alismellus*); Jack Creek, Independence Mountains, *Holmgren 687*, *WSC*, *Utah*, *RM* (tending to var. *alismellus*), *Maguire & Holmgren 22451* in 1943, *Utah*, *UA*, *GH*. WHITE PINE CO. Stella Lake, Lehman Caves, 10,000 feet, *Moore & Franklin 522 Pom-B*, *USNA*.

WYOMING: Certain collections are intermediate between this plant and var. *Davisii*. Some of these are noted under the latter variety. The following are perhaps closer to var. *Hartwegii*: Teton Forest Reserve, *Brandegee* in 1897, *UC*; West Thumb, Yellowstone National Park, *McCalla 4031*, *Pom-B*, *Maguire 13587* in 1936, *Utah*.

Type collections.—(1) Var. *caule petiolisque basi hirsutis*, "*In uliginosus* (Bear Valley) montium Sacramento," *Hartweg 1627* (*155*). Sierra Nevada in Nevada County, California. Isotype, *GH*, photograph *Pom-B*. (2) *R. Hartwegii*, based upon the unnamed variety listed above. (3) *R. arnoglossus*, "Subalpine in the Ruby [East Humboldt] Mountains, eastern Nevada; collected by the writer [Greene], 20 July, 1896." Type, *HGr 2388-9*.

63c RANUNCULUS ALISMAEFOLIUS var. LEMMONII (A. Gray) L. Benson,* Amer. Jour. Bot. 23: 172. 1936 (Moderate policy: *R. Lemmonii* A. Gray)

R. Lemmonii A. Gray, Proc. Amer. Acad. 10: 68. 1875.

Meadows of valleys in the arid mountain region at 5,000 to 6,500 feet elevation; desert phase of the Sierran Montane Forest. Modoc County to Truckee, California. May to July.

Specimens examined.—CALIFORNIA: *Lemmon* in 1875, *Mo*; *Fremont Expedition to California* in 1846, *DS* (part is var. *Hartwegii*). MODOC CO. *Sonne* in 1886, *NY* (barely hirsute at the bases of the stems and petioles). SHASTA CO. Above Drakesbad, *Applegate 5774*, *DS*. PLUMAS CO. Big Meadows, *Austin* in 1878, *HGr*; Crescent

* Cf. Table 11.

Mills, *Clemens 7002, NR.* SIERRA CO. Sierra Valley, *Lemmon, GH, DS* (in part) (type and isotype, cf. below). NEVADA CO. Prosser Creek near Truckee, *Sonne* in 1894, *Pom*, in 1895 and 1896, (*UC exsiccatae 289*), *UC, Pom, CAS, SD, GH*, May & July, 1895, *Pom;* sagebrush flats near Truckee, *Sonne* in May & June, 1895, *UC, RM, Ill, GH, Mo, PA;* dry valleys near Truckee, *Sonne* in May & June, 1895, *NY, Pom, WSC, Pom-B;* Truckee, *Sonne* in 1886, *HGr, NR*, in 1895, *UC, WSC.*

Type collection.—"Sierra Valley California,—alt. 5,000 feet, J. G. Lemmon." Type, *GH*, photograph *Pom-B;* isotype, *DS 10887* (only one of the plants on the sheet, however.) The Sierra Valley specimens (appearing to be isotypes) seen in other herbaria are not this variety. In fact, four species are represented among them.

63d **Ranunculus alismaefolius** var. **Davisii** L. Benson, var. nov.*

(Moderate policy: var. of *R. Lemmonii A. Gray.* Liberal policy: as species)

Radicibus fusiformibus; caulibus gracilis hirsutis scaposis, 3- vel 7-floris; foliis lanceolatis; petiolis gracilis hirsutis vel subglabris; petalis 4-7 mm. longis, 2-3.5 mm. latis; acheniis 7-15, 1.5 mm. longis; carpellorum capitulo 3.5-5.5 mm. diametro; receptaculo 1 mm. longo.

Mountain meadows at 6,000 to 8,500 feet elevation; Pacific and Rocky Mountain Forests. Mountains of mostly Eastern Oregon to western Montana and western Wyoming, possibly Ruby (East Humboldt) Mountains, Nevada, including some or all the collections under var. *Hartwegii.* Summer.

Specimens examined.—OREGON: The Oregon collections nearly all tend toward var. *Hartwegii.* HOOD RIVER CO. Certain specimens from the vicinity of Mt. Hood approach this variety, but they may be referred probably more accurately to var. *Hartwegii.* These are as follows: Elk Meadows, *J. W. Thompson 3230, Wash, PA, DS, 3239, Wash, PA, DS, 3279, Wash, DS, 5061, Wash, Pom-B, DS, GH, Mo, PA;* Hood River Meadows, east of Mt. Hood, *Henderson 876* in 1924, *GH, UO;* 15-mile Meadow, *G. N. Jones 4134, GH, Wash, UC, PA.* DESCHUTES CO. Bog at the eastern base of Brokentop Mountain, *Peck 14401, WillU, PA, DS, Wash.* GRANT CO. Strawberry Mountain, Blue Mountains, 8,000 feet, *Henderson 5656, CAS, DS, GH.* BAKER CO. Downy Lake, Sumpter Valley Watershed, Blue Mountains, *Ferris & Duthie 879, DS.*

IDAHO: IDAHO CO. Bernard Lakes, *R. J. Davis 2306, ISB, Pom-B;* Dry Diggins, Seven Devils Mountains, *St. John & Mullen 8461, WSC.* VALLEY CO. Payette Lake, *M. E. Jones 6136* in 1899, *Pom, Mo;* Elk Summit, *R. J. Davis 2662, ISB, Pom-B;* Landmark, *R. J. Davis 2714, Pom-B, ISB, Clo, Utah* (type and isotypes, cf. below); Payette National Forest, *Mains D13* in 1912, *RM, 7* in 1912, *RM;* Bear Valley, *Hitchcock & Muhlick 9695, Wash;* Tyndall Meadows, 3 miles north of Deadwood Summit, *G. N. Jones 5138, GH;* Gold Fork Lookout, Sawtooth Mountains, *J. W. Thompson 13782, Wash, Pom-B, CAS, DS, UC, US, PA, Mo, GH.* CUSTER CO. Custer-Lemhi county border, Divide between Morgan Creek and Panther Creek 20 miles northwest of Challis, *Hitchcock & Muhlick 9416, Wash, Pom-B, WSC, CAS;* Lolo Creek Forest Camp near Marsh Creek 25 miles northwest of Stanley, *Cronquist 2764, Utah, ISB, Mo, GH;* Cape Horn, *Macbride & Payson 3530, RM, Pom, GH, Mo, UC, CAS, DS* (the last three, in particular, nearly glabrous). ELMORE CO. Trinity Lakes, 10 miles west of Featherville *Hitchcock & Muhlick 10323, Wash, Pom-B, WSC, CAS.* BLAINE CO. Alturas Lake, *Cronquist 2565, Utah, ISB, Mo, GH.*

MONTANA: Trail Creek Prairie, *S. Watson 9* in 1880, *GH, US;* Granite, *Kelsey* in 1892, *DS, UC, Scheuber 203, NY.* CLARK CO. Helena, *Kelsey* in 1892, *NY, Pom* (approaching var. *Hartwegii*), *Ill, UC.*

WYOMING: YELLOWSTONE NATIONAL PARK. Firehole River, *B. H. Smith* in 1911, *PA* (tending toward var. *Hartwegii*); 5 miles west of West Thumb, *B. & R. Maguire*

* Cf. Table 11.

1163 in 1932, *Uath, Pom, UC, Mo;* between West Thumb and Old Faithful, *B. & R. Maguire 1164* in 1932, *UC, Utah;* Spring Creek, *A. & E. Nelson 6289, US, Pom, Ill, Mo, GH, RM 163279* (*RM 20387* in part, but the sheet includes a large-flowered individual); Yellowstone Lake, *Oleson 265* in 1904, *RM;* Yellowstone Canyon, *Burglehaus 168* in 1894, *Wash, Oleson 260* in 1904, *RM;* Grebe Lake, *Langdon 68* in 1934, *Wash;* Yellowstone Falls, *Blankinship* in 1899, *Pom* (tending toward var. *Hartwegii*). COUNTY NOT DETERMINED. 15 miles west of Leckie, *Merrill & Wilcox 524, RM, US* (flowers large as in var. *Hartwegii*).

Type collection.—Open meadow, Landmark, Valley County, Idaho, 7E.-15N., *Ray J. Davis 2714,* July 9, 1940. Type in the Herbarium of Lyman Benson, *Pomona College Herbarium No. 268790;* isotypes: *ISB, Clo, Utah 54019.*

63e RANUNCULUS ALISMAEFOLIUS var. ALISMELLUS A. Gray,* Proc. Amer. Acad. 7: 327. 1868 (Moderate policy: var. of *R. Lemmonii* A. Gray. Liberal policy: as species)

R. alismellus Greene, Fl. Fran. 1: 297. 1892.

Mountain meadows and wet ground near snow banks at 4,500 to 6,500 feet elevation northward and 7,000 to 10,500 feet southward; Sierran Subalpine Forest. Eastern peaks of the Cascade Mountains in central and southern Washington; high mountains of Oregon to the high North Coast Ranges and the San Bernardino and San Jacinto Mountains, California; rare in Idaho; Washoe, Ormbsy, and Douglas counties, Nevada; rare in western Montana; northern edge of Baja California. June and July.

The Oregon form is more robust and with branching stems, and it tends toward the variety *Hartwegii.* Typical var. *alismellus* occurs on the eastern side of the Cascade Mountains in Washington, however.

A markedly pilose form has been collected at Glacier Canyon, Mt. Dana, on the edge of Yosemite National Park (*J. T. Howell 20243, CAS*).

Significant specimens.—WASHINGTON: KITTITAS CO. Wenatchee Mountains, *Cotton 1183* in 1903, *NR.* YAKIMA CO. *Brandegee 608* in 1883, *UC* (robust); Bald Mt., *St. John 7813, WSC;* Ahtanum River, *Henderson* in 1892, *Wash* (tending toward var. *Hartwegii*); Mt. Rainier Forest Reserve, *Flett* in 1899, *NR;* Mt. Adams, *Suksdorf 323, WSC, 495, WSC, 719, WSC,* in 1902, *WSC, Henderson 14* in 1882, DS, Aug. 7, 1882, *DS,* in 1892, *NR, Howell* in 1882, *NR, Mo, Marsh* in 1894, *NR, PA, J. W. Thompson 11141, Wash.*

CALIFORNIA: (Only the significant collections). HUMBOLDT CO. Trinity Summit, *Jepson 2106, J. Davy & Blasdale 5767, UC.* TRINITY (?) CO. Summit of Trinity Mountains, *Marshall* in 1886, *HGr;* Union Lake, Salmon Mountains, *H. M. Hall 8617, UC.* TEHEMA CO. South Yollo Bolly, *Jepson* in 1897, *J.* GLENN CO. *Plaskett* Meadows, *J. T. Howell 19778, CAS 20243, CAS.* SAN BERNARDINO CO. San Bernardino Mountains. Bear Valley, *Parish 3690, DS, 3693, DS, GH, HGr, M. E. Jones 6135* in 1900, *Pom, Munz 5620, Pom, UC, Clo, Peirson;* Bluff Lake, *Parish 3029, UC, GH, Mo, HGr, DS, Johnston* in 1924, *Pom, Peirson* in 1924, *Peirson 4900, Ewan 2713, CAS, RM, Hilend 431, CAS, Goodman & Hitchcock 1758, Mo.* RIVERSIDE CO. San Jacinto Mountains. *Jaeger* in 1921, *GH;* Tamarck Valley, *H. M. Hall 2405, DS, UC, Mo;* Tahquitz Meadow, *Hasse* in 1892, *DS, Munz 6034, Pom, UC, RM;* Round Valley, *Jaeger 471, NR, Johnston* in 1916, *Pom;* Long Valley, *Jaeger 567, RM.*

IDAHO: Occurring in intergrading forms; the following more clear in identity than most collections: IDAHO CO. Bernard Lakes, *R. J. Davis 2306, ISB;* "The Swamps,"

* Cf. Table 11.

near Lily Pad Lake, Seven Devils Mountains, *J. Packard 320*, June 13-20, 1937, *ISB, WSC, Mo.*

MONTANA: BEAVERHEAD CO. Monida, *F. H. Rose 470, WSC.* Collected also at Gibbons Pass on the Idaho boundary, *F. H. Rose 199, WSC.*

BAJA CALIFORNIA: "Topo beyond Campo Seco," "From the Herb. of George E. Davenport, Given to the Gray Herb., Dec., 1922, by his daughter, Mary E. Davenport," *GH.* The exact locality is not familiar to the writer. However, specimens of *Ranunculus aquatilis* var. *capillaceus* were collected at "Topo, northern Lower California" by Orcutt on July 9, 1884, and it is possible that the collection of *R. alismaefolius* var. *alismellus* was made in the same "mountains" possibly even at the same time.

Type collection.—"Lake Tenayo [Tenaya] and on Mt. Dana, Sierra Nevada, to the height of 12,000 feet, Bolander." Yosemite National Park, California. The Lake Tenaya specimen is *Brewer 1684.* The Mt. Dana specimen is by *Bolander*, and it was designated first as a lectotype, cf. L. Benson, Amer. Jour. Bot. 23: 172. 1936. Lectotype, *Brewer 1684, GH*, photographs *DS* and *Mo;* isotypes, *UC 9366, Pom-B 268686;* cotypes (Mt. Dana, *Bolander*), *GH*, photograph *DS. US 320377.*

63f RANUNCULUS ALISMAEFOLIUS var. MONTANUS S. Wats.* Rept. U. S. Geol. Expl. 40th Par. 5: 7. 1871 (Moderate policy: *R. calthaeflorus* Greene)

R. calthaeflorus Greene, Erythea 3: 45. 1895. *R. alismaefolius* var. *calthaeflorus* Davis, Minn. Bot. Studies 2: 495. 1900. *R. unguiculatus* Greene, Pittonia 4: 142. 1900.

Mountain meadows at 6,000 to 9,500 feet elevation; Rocky Mountain Forests. Bingham County, Idaho, and the Ruby Mountains, Nevada, to western and southern Wyoming, Utah, and Colorado. June and July.

Significant specimens.—IDAHO: BINGHAM CO. 5 miles southeast of Bone, *G. Steele*, Apr. 27, 1940, *ISB.* The following tend toward var. *Hartwegii:* IDAHO CO. Bennett, *Christ 7038, Chr.* VALLEY CO. Alpha, *Christ 7222, Chr;* West of New Meadows, *Christ 9226, Chr.* In all three specimens the petals are broad.

Type collections.—(1) Var. *montanus*, "Shore of Marian Lake in the East Humboldt [Ruby] Mountains, Nevada, and at the head of the Provo River in the Uintas; 9,000 feet altitude; June-August. (18.)" The collection from Provo Canyon, Uintah Mountains, by Sereno Watson in 1868 has been designated as a lectotype, cf. L. Benson, Bull. Torrey Club 69: 303. 1942. This plant has only 5 petals, but it is of this variety in other characters. Lectotype, *GH*, photograph *Pom-B;* isotype, *NY.* In the U. S. National Herbarium the Marian Lake specimen is sheet *No. 982* (photograph *Pom-B*), and the Uintah plant is mounted on the same sheet (but unnumbered). An East Humboldt Mountain specimen, *GH*, is var. *Hartwegii* (or possibly var. *Davisii*). (2) *R. calthaeflorus*, "Plant of the Colorado Rocky Mountains chiefly, at elevations a little below the limit of trees; the *R. alismæfolius*, var. *montanus* of S. Watson, partly; also the type of the unpublished *R. alismaefolius* of Geyer." At the bottom of the same page, Greene states, "Geyer's specimens, on the labels of which he wrote this [*R. alismaefolius*] as a new name were of the Rocky Mountain species which I now name *R. calthaeflorus.*" Greene confuses Geyer's specimens from the "Rocky Mountains," but actually relict Pacific Forest at Coeur d'Alene, Northern Idaho, with the plant from the southern and central Rocky Mountain System, which is the one he describes as *R. calthaeflorus* (note that the petal number is given as 10). That Greene did not know Geyer's plant differed from Watson's variety *montanus* is emphasized further by lack of a Geyer specimen in the Herbarium Greeneanum and by the following statement, "*R. Hartwegii* of the Californian Sierra differs essentially from the Rocky Mountain *R. calthaeflorus* . . . in its broadly obovate petals only half as numerous, namely five." So also does Geyer's plant, which is identical with Greene's *R. Bolanderi* from coastal California. However, the following is quoted from Greene,

* Cf. Table 11.

"Asa Gray's statement that '*R. Bolanderi*, Greene, Bull. Calif. Acad. ii. 58, answers to the type of this species *R. alismaefolius*' is not only without foundation; it proves that the author did not know that Geyer's type was not Californian." What really is proved is that Greene did not understand Geyer's type and knew only that it came from the "Rocky Mountains" and that Greene actually was describing the southern and central Rocky Mountain plant as *R. calthaeflorus* and not renaming Geyer's species. Several specimens collected prior to 1895 are in the Herbarium Greeneanum and *No. 2391* of that collection has been designated as a lectotype of *R. calthaeflorus*, cf. L. Benson, Bull. Torrey Club 69: 303. 1942. It was collected in wet, boggy ground near Georgetown, Colorado, at 12,000 feet altitude by *Chas. S. Sheldon* on August 17, 1884, *No. 281*. (3) *R. unguiculatus*, "Common 'on sites of old snow banks' at 11,500 feet in the mountains of southern Colorado [Pagosa Peak], C. F. Baker [333], 28 Aug., 1899." Type, mounted on two sheets, *HGr 2994 and 7801*; isotypes, *Pom 150720, RM 163284*, photograph *Pom-B, GH, Mo* (not numbered), *US 368917, 965825*.

64 RANUNCULUS ORESTERUS L. Benson apud Benson & Carter, Amer. Jour. Bot. 26: 555. 1939

Practically glabrous terrestrial perennials; roots numerous, filiform, 0.5-1 mm. in diameter, each root densely covered with hairs for its entire length; stems erect, not rooting, about 1 dm. long, 1-1.5 mm. in diameter, 2-4-flowered, somewhat fistulous, glabrous except for long appressed stout hairs at the bases; basal leaf blades simple, each broadest at the middle and tapering to the two acute ends, 3-4.5 cm. long, about 6-7 mm. broad, entire, glabrous, the petioles 2-4 cm. long, glabrous, markedly dilated, 1-3 mm. broad, the stipular leaf base perhaps forming almost the entire petiole (a diagnostic character); cauline leaves alternate or almost opposite, 2-5.5 cm. long, 2-8 mm. broad, sessile, some bracts opposite, sessile; pedicels 15 mm. long in flower, 2-5 cm. long in fruit, glabrous; sepals 5, yellowish, petaloid, spreading, narrowly oblong, 3-5 mm. long, 1-1.5 mm. broad, the nectary scale glabrous, apparently forming a pocket; stamens about 15; achenes 15-25 in a depressed-globose head 2-4 mm. long and 2.5-4 mm in diameter, each achene obovoid or oblong-obovoid, 1-1.5 mm. long, 0.7-1 mm. dorsoventrally, 0.7-0.8 mm. laterally, smooth, glabrous, the margin with a distinct nerve, the beak filiform, 0.4-0.6 mm. long, not curved; receptacle subglobose, 1 mm. long in flower, 1.5-2.5 mm. long in fruit, glabrous.

Swales and meadows in the mountains at about 4,000 feet elevation; Sierran Montane Forest. Blue Mountains between Baker and Canyon City, Oregon; near New Meadows, Adams County, McCall, Valley County, Midvale, Washington County and Hill City, Elmore County, Idaho. May; in fruit by late May or early June.

Specimens examined.—OREGON: UNION CO. (?) Blue Mountains between Baker and Canyon City, Cusick 2800, *DS, UO, Pom-B, WSC, NY, Pom, GH, Mo* (type and isotypes, cf. below). UNION CO. Subalpine, *Cusick* in May, 1880, *GH*.

IDAHO: ADAMS CO. 6 miles west of New Meadows, *Christ 9236, Chr;* 1 mile north of New Meadows, *Christ & Ward 7243, Chr;* southwest of New Meadows, *R. J. Davis 94, ISB;* 4 miles west of New Meadows, *Ray J. Davis 1913, ISB, Pom-B, Clo, Chr.* VALLEY CO. 2 miles west of McCall, *Hitchcock & Muhlick 8512, Pom-B, CAS, Wash.* WASHINGTON CO. Midvale, *Tucker* in 1935, *ISB, Chr.* ELMORE CO. Hill City, *Christ & Ward 7041, Chr.*

Type collection.—"In swales at the summit of the Blue Mountains, Eastern Oregon,

altitude 4,000 feet (fide Washington State College specimen), Baker City-Canyon City road. Known only from the type collection by *William C. Cusick*, June 4, 1902, *No. 2800*. Type specimen in the Dudley Herbarium, Stanford University, California, *No. 96453*. Isotypes: University of Oregon Herbarium, 3 sheets marked by the writer in 1932 with a square containing an x in its lower left corner; Washington State College Herbarium *No. 10201*; New York Botanical Garden." One of the specimens from the University of Oregon was presented to the herbarium of the writer in 1939 through the courtesy of Dr. LeRoy Detling. Type, *DS 96453*; isotypes, *UO* (2 sheets), *Pom-B 268472, WSC 10201, NY, Pom 99962, GH, Mo.*

65 RANUNCULUS AMBIGENS S. Wats. Bibl. Ind. N. Amer. Bot. 1: 16. March, 1878 and Proc. Amer. Acad. 14: 289. May 14, 1879

R. obtusiusculus Raf. Med. Repos. N. Y. II. 5: 359. 1808, nomen confusum, cf. Fern. Rhodora 38: 173-5. 1936. *R. Flammula* var. *major* Hook. Fl. Bor. Amer. 1: 11. 1829. *R. ambigens* var. *obtusiusculus* Davis, Minn. Bot. Studies 2: 494. 1900, nomen confusum.

Glabrous palustrine (or rarely aquatic) perennials; roots filiform, about 1 mm. in diameter, sometimes partly pubescent on the older parts; stems decumbent and partly subterranean, the flowering portions erect or suberect, the stem rooting on the basal portion, 5-10 dm. long, 5-8 mm. in diameter, branching at the inflorescence, 5-15- or 18-flowered, simple below; basal leaf blades none, the cauline simple, alternate, lanceolate (in aquatic forms ovate or ovate-lanceolate) 2-12 cm. long, 0.4-2 or 3 cm. broad, usually denticulate, the petioles usually about 25 cm. long, sometimes longer, the stipular leaf bases up to 1.5 or 2 cm. long; the bracts not greatly reduced, short-petioled; pedicels 1.5-4.3 cm. long in flower, mostly 2.5-5 cm. long in fruit, glabrous; sepals 5, yellowish-green, spreading, narrowly elliptic, about 4 mm. long, 1.5-2.7 mm. broad, glabrous, half the length of the petals, promptly deciduous; petals 5-6, yellow, broadly oblanceolate, 5-7 mm. long, 2-3 mm. broad, the nectary scale glabrous, forming a pocket, truncate; stamens 30-50; each achene nearly rectangular, about 2 mm. long, 1.4 mm. dorsoventrally, 0.7 mm. laterally, smooth (very finely reticulate), glabrous, the margin narrowly keeled, the beak rather slender, subulate, 1.1-1.3 mm. long, straight; receptacle cylindroid-obovoid, 1-2 mm. long in flower, 3-5 mm. long in fruit, glabrous.

Wet clay soil at low altitudes; Northern and Deciduous forests. Minnesota to Maine (York) and southward to Louisiana, Tennessee, southeastern Virginia (Appomattox River); possibly Georgia (Chapman.) Mostly coastal in New England. May to August.

This species is related closely to *R. Lingua* L. of the Old World, which is distinguished by the following characters: Pedicels and usually the calyx as well as commonly the rest of the plant appressed-pubescent; leaves 15-25 cm. long, 15-25 mm. broad; petals obdeltoid-orbicular, 13-22 mm. long and proportionately broad; achene beaks more slender than in *R. ambigens*.

Significant specimens.—LOUISIANA: Near Jackson, *Herb. Riddell*, Vide Synopsis Flor. West. No. 54, *NY*.
VIRGINIA: Appomattox River, *Fernald, Long, & Hopewell 5775, GH*.
GEORGIA (?): Southern Flora, *Chapman, NY*.

Type collections.—(1) *R. obtusiusculus*, "In New-Jersey in marshy places." Observed in 1803 and 1804 by C. Rafinesque-Schmaltz. Fernald, *loc. cit.*, writes as

TABLE 12.—Varieties of *Ranunculus flammula* L.

Var. *genuinus*	Var. *ovalis*	Var. *filiformis*
Stems rooting at only the lower nodes, 1-5 dm. long, 2-7 mm. in diameter, branching above and 2-25-flowered, fistulous below.	Stems usually rooting at least below, 1-4.5 dm. long, mostly 0.8-1.5 mm. in diameter, usually flowering from one or two branches at each rooted node, but sometimes several-flowered apically.	Stems rooting at practically every node, 1-3 or rarely 4 dm. long, 0.2-1 mm. in diameter, rarely larger in the lowest internode, with 1 or 2 flowers at each distal rooting node.
Basal and cauline leaves similar, mostly oblanceolate or lanceolate or sometimes ovate-lanceolate, 2-6 or 8 cm. long, 3 or 5-10 or 13 mm. broad, entire or serrulate, glabrous, or appressed-pubescent, the petioles mostly 2-7 cm. long.	Basal leaf blades markedly broader than the petioles, 1-5 cm. long, 1.5-7 or rarely 20 mm. broad, broadest at the middles and tapering to both ends, entire, the petioles 2-6 or up to 13 mm. long, glabrous; cauline leaves 1-2 or 3 cm. long, 1.5-4 or 6 or rarely 12 mm. broad, oblanceolate or broadest at the middles or rarely ovate, petioled or rarely sessile and the bases sheathing the stem.	Basal leaf blades simple, filiform or linear, barely broader than the petioles, 1.5-6 or 9 cm. long, 0.5-1.5 mm. broad, entire, distally truncate and glandular, glabrous or with stout appressed hairs 2-8 mm. long; cauline leaves clustered at the nodes, the blades expanded, tapering to both ends, about 3 cm. long, 1-1.5 mm. broad, petioled.
Petals 4-8 mm. long.	Petals commonly 3.5-5 or rarely 2 or 6.5 mm. long.	Petals (sometimes as many as 11), 2-4 or rarely 7 mm. long.
Achenes 20-50 in a globose head 3-5 mm. long and 4-5 mm. in diameter, the beaks stout, 0.1-0.2 mm. long, stigmatic across the truncate apices.	Achenes 10-20 or 25 in a hemispheroidal head 2.5-3.5 mm. long and 3-4.5 mm. in diameter, the beaks 0.3-0.5 or 0.6 mm. long, the longer types with the stigmatic surface not wholly apical.	Achenes 5-15 in a hemispheroidal cluster 1.5-2.5 mm. long and 2-3.5 mm. in diameter, the beaks 0.3-0.5 or rarely 0.2 or 0.7 mm. long, slender above, the longer types with the stigmatic surface not wholly apical.
Receptacle about 3 mm. long in fruit.	Receptacle about 1 mm. long in fruit.	Receptacle less than 1 mm. long in fruit.
Newfoundland; St. Pierre and Miquelon; Nova Scotia; Old World.	Western North America; uncommon and less well developed eastward to Labrador, New England, and Pennsylvania.	Alaska to Labrador; Greenland; Iceland; southward to Washington, Wyoming, the northern tier of states from Minnesota to New York; New England; Pennsylvania; New Jersey; Old World.

follows, "That Rafinesque's drawing of an annual, with bluntish leaves, leafy-bracted peduncles, gamopetalous corolla, linear or linear-lanceolate sepals, and rounded obovate petals (his fig. 2), is not a recognizable illustration of *R. ambigens*, which is a coarse and obvious perennial, with attenuate leaves, bractless peduncles, ovate sepals and distinct (as in all the genus) oblong petals, should be obvious. . . . Except for the alternate leaves the drawing of the habit could as well have been made from a vague recollection of *Lysimachia* (*Sieironema*) *lanceolata* as from *Ranunculus ambigens*." (2) Var. *major*, "Canada. *Mr. Goldie*." (3) *R. ambigens*, as first published (Bibl. Ind. N. Amer. Bot. 1: 16. March, 1879) "In inundated places and small rivulets: Pennsylvania & Virginia."

66. RANUNCULUS FLAMMULA L.

Nearly glabrous palustrine perennials; roots filiform, light-colored, 0.1-1.8 mm. in diameter; stems reclining often stoloniferous, rooting at the lower nodes, 1-5 dm. long, 0.2-7 mm. in diameter, simple or branching above and 2-25-flowered, sometimes fistulous below, glabrous or with a few stout, appressed hairs; leaves alternate, often in fascicles at rooting nodes, the blades simple, linear-filiform, oblanceolate, lanceolate, ovate-lanceolate, ovate, elliptic, obovate, 2-6 or 8 cm. long, 0.5-10 or 13 mm. broad, entire or serrulate, acute at both ends or apically truncate and glandular, glabrous or somewhat appressed-hairy, the petioles 2-7 or 13 cm. long or the leaves sessile, the stipular leaf bases mostly 1-2.5 cm. long; pedicels 2-9 cm. long in flower, 2-10 cm. long in fruit, appressed-hairy; sepals 5, yellowish-green, 1.8-5 mm. long, about 1.5-2.5 mm. broad, appressed-hairy dorsally or glabrous, half or two-thirds the length of the petals, promptly deciduous; petals 5 (or up to 11 in var. *filiformis*), yellow, obovate or cuneate-obovate, 2-8 mm. long, 1.3-7 mm. broad, the nectary scale glabrous, forming a tiny pocket, usually truncate; stamens 25-50; achenes 5-50 in a globose or hemispheroidal head 1.5-5 mm. long and 2-5 mm. in diameter, each achene obovate, 1.3-1.7 mm. long, 1-1.2 mm. dorsoventrally, 0.5-0.6 mm. laterally, smooth or finely reticulate, glabrous, the margin clearly marked but not prominent, the beak stout or in some varieties slender, 0.1-0.5 or 0.7 mm. long, straight, usually stigmatic largely across the truncate apex; receptacle obovoid, 1 mm. long in flower, 0.6-3 mm. long in fruit, glabrous.

No one of the four varieties is wholly clear in its definition. However the populations are well-marked in extreme forms:

66a RANUNCULUS FLAMMULA var. GENUINUS Buchenau.*

R. Flammula L. Sp. Pl. 548. 1753.

Marshy ground near sea level; Northern Forest. Europe; Quiddy Viddy Lake, Newfoundland; St. Pierre and Miquelon Islands; and Hants and Yarmouth counties, Nova Scotia; occurring on the Pacific Slope as an intergrade to var. *ovalis*. July to early September.

Specimens examined.—NEWFOUNDLAND: Quiddy Viddy (Quidi Vidi) Lake, East Avalon Peninsula, *Robinson & Schrenk 30* in 1894, *NY, GH, Mo, Can, US, Pom-B, Fernald & Wiegand 2426, NY, PA, US, 5426, GH, Can, 5427, NY, GH, RM, US, Can, Mo, St. John & Williamson 744, NY, PA, 744½, NY, PA, Ayre* in 1931, *NR*. ST. PIERRE & MIQUELON: *Arsène 257, GH*.

* Cf. Table 11.

NOVA SCOTIA: HANTS CO. Mt. Uniacke, *Prince & Atwood 321, DS.* YARMOUTH CO. Tusket, *Fernald & Long 21243, NY, GH, Mo, PA, Can, US, Fernald, Bartram, Long, & Fassett 23846, GH, PA; Bissell & Graves 21242* in 1920, *GH, Can.*

Type collection.—"*Habitat in* Europae *pascuis udis.*"

66b RANUNCULUS FLAMMULA var. OVALIS (Bigel.) L. Benson,* Bull. Torrey Club 69: 305. 1942. (Very liberal policy: *R. reptans* L. var. *ovalis* (Bigel.) Torr. & Gray)

R. filiformis Michx. var. *ovalis* Bigel. Fl. Bost. ed. 2. 239. 1824, not *R. ovalis* Raf. in 1814. *R. reptans* L. var. *ovalis* Torr. & Gray, Fl. N. Amer. 1: 16. 1838. *R. unalaschensis* Bess. ex Ledeb. Fl. Ross. 1: 32: 1842, as syn. *R. Flammula* L. var. *unalaschensis* Ledeb. Bull. Soc. Nat. Mosc. 342: 41. 1861. *R. reptans* L. var. *strigulosus* Freyn, Deuts. Bot. Monatss. 8: 181. 1890. *R. microlonchus* Greene, Erythea 4: 122. 1902. *R. Flammula* var. *varians* Blankinship, Mont. Agric. Coll. Sci. Studies Bot. 1: 55. 1905. *R. Flammula unalaschensis* Piper, Contr. U. S. Nat. Herb. 11: 272. 1906. *R. Flammula* L. var. *strigulosus* Freyn ex Peck, Man. Higher Pl. Ore. 302. 1941, nom. nud., without reference or Latin diagnosis.

Muddy or marshy ground or wet sand from sea level up to 3,000 feet elevation northward or up to 8,000 feet southward; Northern, Rocky Mountain, Pacific, Sierran Montane, and Deciduous forests. Alaska and southward to north-coastal (as far south as Marin County) and montane California, Arizona (Kaibab Forest and Lukachukai Mountains), and New Mexico (Tunitcha and Mogollon mountains), and eastward to Labrador, Newfoundland, New England, and Pennsylvania; Iceland. Summer.

This variety is developed best in the Western States, especially the Pacific States. The form occurring from Manitoba and Labrador to New England and New York to which the type (Boston) must have belonged is an intermediate between the extreme of var. *ovalis* and var. *filiformis*. For this reason, the name var. *strigulosus* was maintained previously in one earlier paper for the Western plants. However, the extreme form occurs here and there in eastern Canada and in the United States from Minnesota eastward.

A form with unusually short, broad, thick basal and cauline leaves occurs in Newfoundland (St. John Bay, *Fernald et al. 28256, GH;* Ingornachoix Bay, *Fernald & Wiegand 3413, GH*). An extreme for leaf size was collected at Sequim, Washington (*J. M. Grant* in 1915, *Wash*).

CALIFORNIA: Common in Del Norte, Humboldt, Siskiyou, and Modoc counties and in the Sierra Nevada as far south as Fresno County. MENDOCINO CO. Little Lake, *Rattan* in 1882, *DS;* Howard Lake, Forest Reserve, Eastwood 15266, *CAS.* LAKE CO. Mt. Hanna, *Jepson* in 1897, *J;* Boggs Lake, Mt. Hanna, *Mason 12669, UC, Pom-B.* MARIN CO. Inverness, *Jepson 8300, J. Schreiber 862, UC;* Point Reyes, *Davy 6713, UC, Eastwood 11810, CAS, Richardson* in 1930, *CAS,* Between Inverness and Point Reyes, *Ferris & Wiggins 8102, WSC, DS, Pom-B;* northwest shoulder of Mt. Tamalpais, *Bacigalupi & Leschke 2705, DS;* pond at Hidden Lakes *Leschke* in 1941, *CAS;* Ledum Swamp, *J. T. Howell* in 1939, *CAS;* 4 miles north of Bolinas, *J. T. Howell 22103, CAS.* FRESNO CO. Dinkey Creek, *Hall & Chandler 400, UC.* SAN BERNARDINO CO. San Bernardino Mountains. Talmadge Meadow, *Parish 3396, DS;* Little Bear Valley, *Parish 996, DS, Chandler* in 1897, *UC.*

Significant specimens.—ICELAND: Laxardal, north Iceland, *Palson 191* in 1943, *RM.*

* Cf. Table 12.

NEVADA: WASHOE CO. Franklin-Washoe, *Heller* in 1912, *NR.* ELKO CO. Ruby (East Humboldt) Mountains, *M. E. Jones, Pom, Maguire & Holmgren 22162* in 1943, *Wash, Utah, Mo.*

ARIZONA: COCONINO CO. 18 miles south of Jacobs Lake, Kaibab Forest *Kearney & Peebles 13705, US, Sac, 13706, Sac;* V. T. Meadow, North Rim Grand Canyon, Bryant in 1943, *GCNP, Pom-B;* Greenland Lake, North Rim Grand Canyon, *Collom* in 1945, *GCNP;* De Motte Park, Buckskin Mountains, *M. E. Jones 6056aa* in 1894, *Pom, US.* APACHE CO. Lakachukai Mountains, *Goodman & Payson 2934, CAS, Clo, Wash, Mo.*

NEW MEXICO: SAN JUAN CO. Tunitcha Mountains, *Standley 7606, US;* Lakeside, 2 miles north of Washington Pass, Tunitcha Mountains, *Goodman & Payson 3222, Clo, Wash.* SOCORRO CO. Middle Fork of the Gila River, Mogollon Mountains, *Wooton* in 1900, *NY.*

NEBRASKA: *H. Engelamnn* in 1856, *Mo.*

PENNSYLVANIA: Swamp by Goldstream, ... (Determined by J. Macoun July 25, 1905) in 1844, *DS.*

Type collections.—(1) Var. *ovalis*, "Sent from Danvers by Mr. Nichols." Mr. Weatherby of the Gray Herbarium wrote as follows on January 10, 1939, "We have none of Bigelow's original material of *R. reptans* var. *ovalis*. Whether any exists, I do not know. I have no doubt, however, that the material we have represents this plant." The common, rather broad-leaved form from the vicinity of Boston is accepted as typical. (2) *R. unalaschensis*, "*R. unalaschensis*, Besser in *herb. Zeyheri.*" "Hab. in Unalaschka! (Chamiss., Eschsch.)" This plant was interpreted by Fernald, Rhodora 19: 137. 1917, as *R. reptans* var. *ovalis*. The type has not been seen. (3) Var. *strigulosus*, "Oregon. Mt. Hood. 24 Juli 1888, leg. Röll." Peck in combining this varietal name under *R. Flammula* gave no reference to Freyn's combination under *R. reptans* L. (4) *R. microlonchus*, "Collected by the writer in northern Idaho, August, 1889." Lake Pend Oreille, Greene, Aug. 9, 1889. Type, *HGr 2423.* (5) Var. *varians*, "Crow Creek, Mission Mts. [Montana], Aug., 1897, M. J. Elrod, 234." Isotype, *NY.*

The following represents a minor population not quite worthy of varietal rank but worthy of record: *Ranunculus Flammula* var. *samolifolius* (Greene) L. Benson, Bull. Torrey Club 69: 306. 1942. (*R. samolifolius* Greene, Pittonia 3: 13. 1900. *R. reptans* var. *samolifolius* L. Benson, Amer. Jour. Bot. 23: 171. 1936.) Stems 1-4 dm. long, rather stout; leaf blades ovate to obovate or very broadly oblanceolate, 1.5-3 cm. long, 1-1.2 cm. broad, usually sessile and the petioles usually sheathing the stem; otherwise like the usual forms of var. *ovalis*. Mountain meadows at 4,500 to 6,500 feet elevation; Sierran Forest. Occasional in Washington and Oregon and particularly in the Cascade Mountains from Klamath County, Oregon, to Plumas County, California. Summer. A fairly well-marked geographical form, the characters of which do not quite entitle it to varietal rank. The writer now considers this plant as merely a form of var. *ovalis*.

Specimens examined.—BRITISH COLUMBIA: Upland, Victoria, *W. R. Carter* in 1817, *GH* (intermediate).

WASHINGTON: ISLAND CO. Langley, Whidby Island, *J. M. Grant* in 1920, *Pom.* OKANOGAN CO. Okanogan River south of Omak, *Fiker 1137, DS* (intermediate).

OREGON: Summit of Cascades (Jackson or Klamath Co.) *Austin* in 1893, *HGr.* WASHINGTON CO. Forest Grove, *J. W. Marsh* in 1878, *GH.* DESCHUTES CO. 33 miles south of Bend, *Maguire & Holmgren 26479* in 1946, *Pom.* KLAMATH CO. Lake Odell, *J. C. Nelson 5111, GH;* Aspen Lake, *Copeland* in 1903 (*C. F. Baker's no. 3479*), *Pom, Mo, GH, US* (in part), *NY, HGr;* Klamath Valley, *Cronkhite 87* in 1864, *US;* Upper Klamath Lake, *Applegate* in 1895, *US, GH;* Pelican Bay, Klamath Lake, Peck *9521, DS, WillU, Wash, GH, Mo, NY.*

CALIFORNIA: Sierras in Northern California, *Austin* in 1879, *HGr.* SISKIYOU CO. Mt. Shasta, *Dinwiddie* in 1893, *HGr* (lectotype, cf. below), *H. E. Brown 413* in 1897, *Mo.* MODOC CO. (?) *Austin* in 1894, *HGr.* PLUMAS CO. *Austin* in 1877, *HGr;* Big Meadows, *Austin* in 1897, *HGr, US.*

Type collection.—"A well-marked species of the higher Sierra Nevada, Calif.,

from Mt. Shasta southward." The following specimen from the only definite locality mentioned has been designated as a lectotype: Mt. Shasta, *C. H. Dinwiddie* in 1883, *HGr. 2456*, cf. L. Benson, Bull. Torrey Club 69: 307. 1942. It represents the extreme form of this plant.

R. reptans L. var. *erectus* Victorin & Rousseau, Contr. Inst. Bot. Univ. Montreal (36): 16. 1940, has not been seen. Apparently it is near var. *ovalis*, but its status has not been evaluated. *Type collection.*—"ONTARIO: Tobermory (comté de Bruce), sur de fond desséché d'un petit lac rocheux. 5 août 1932. *Marie-Victorin, Rolland-Germain. & Emile Jacques 46412.* TYPE dans l'herbier de l'Université de Montréal. Distribué sous le nom de *R. microlonchus* Greene."

66c RANUNCULUS FLAMMULA var. FILIFORMIS (Michx.) Hook.*

Fl. Bor. Amer. 1: 11. 1829 (Very liberal policy: *R. reptans* L.)

R. reptans L. Sp. Pl. 549. 1753. *R. filiformis* Michx. Fl. Bor. Amer. 1: 320. 1803. *R. reptans* var. *filiformis* DC. Syst. 1: 248. 1818. *R. Flammula* var. *reptans* Reichenbach, Icon. Bot. *pl. 10. f. 4945β*. 1824. *R. Flammula* var. *intermedia* Hook. Fl. Bor. Amer. 1: 11. 1829, in part. *R. Flammula* var. *reptans* E. Mey. Pl. Lab. 96. 1830. *R. reptans* var. *intermedius* Torr. & Gray, Fl. N. Amer. 1: 16. 1838, in part. *R. Flammula* subsp. *reptans* Syme, Engl. Bot. 1: 34: 1863. *R. Flammula* var. *reptans* Ruoy & Foucaud, Fl. France 1: 83. 1893. *R. intermedius* Heller, Bull. Torrey Club. 25: 583. 1896, neither Poir. in 1804 nor Eat. in 1822.

Marshy ground of lakes, streams, and ditches from sea level (northward) to 6,500 feet elevation (southward); Northern and Deciduous forests. Northern portions of the Old World; Alaska to Labrador and Greenland (about 70° N. Lat.) and Iceland and southward to Washington, Wyoming, and the northern tier of states from Minnesota eastward; New England; Pennsylvania and New Jersey. Summer.

Significant specimens.—WASHINGTON: CLALLAM CO. Lake Crescent, *H. E. & S. T. Parks 659, UC.* GRAYS HARBOR CO. Quinault Lake, *J. M. Grant 936, WSC.* SKAGIT CO. Fidalgo Island, *St. John 79B, WSC.* CHELAN CO. Chelan, *Elmer 490, Pom, RM, Mo.* SPOKANE CO. Newman Lake, *Turesson* in 1913, *RM.*

IDAHO: "Palouse Country and Lake Coeur d'Alene," *Aiton* in 1892, *Ill* (in part). CUSTER CO. Little Redfish Lake, Sawtooth Mountains, *L. Benson 12969, Pom.* A few plants growing on charcoal developed leaves up to 2 mm. broad.

MONTANA: GLACIER NATIONAL PARK. Two Medicine Lake, *Maguire 783* in 1932, *Utah;* Mirror Pond near Upper St. Mary Lake, *Maguire 781* in 1932, *Utah* (*Pom* var. *ovalis*); St. Mary Lake, *Maguire 782* in 1932, *Utah;* Glacier Park Station, *Standley 15091, US.*

WYOMING: Bull Lake Creek, *A. Nelson 729* in 1894, *GH, RM* (with 1 broad leaf), *Ill, US, 3193, RM;* Swan Lake Flat, *Sheldon 206* in 1902, *US, Mearns 2436* in 1902, *US.* YELLOWSTONE NATIONAL PARK. Shoshone Lake, *Rydberg & Bessey 4107, US, NY* (perhaps with broader leaves). TETON CO. Leigh Lake, Grand Teton National Park, *L. Williams 990, RM.* FREMONT CO. Pine Creek, *Larson 49* in 1932, *Utah.* SUBLETTE CO. New Fork Lakes, *E. B. & L. B. Payson 4682, RM.*

COLORADO: The following collection shows on some of the duplicates a strong tendency toward var. *filiformis:* Gunnison, *C. F. Baker 464* in 1901, *RM, GH, Mo* (quite a number of broad leaves), *US* (clearly var. *ovalis*), *Pom* (var. *ovalis*), *WSC.*

Type collections.—(1) *R. reptans*, "*Habitat in* Suecia." (2) *R. filiformis*, "HAB. ad ripas S. Laurentii et sinum Hudsonis." (3) Var. *intermedia*, "On gravelly banks of rivers from Canada to lat. 69°. *Dr. Richardson. Drummond.* Newfoundland, *Mr. Mor-*

* Cf. Table 12.

rison." The description was as follows: "*β intermedia;* caule repente gracili, foliis anguste lanceolatis superioribus linearibus integerrimus." According to Fernald, Rhodora 19: 137. 1917, "It is clear that Hooker was merely separating from the true slender-leaved *R. reptans* (his *R. Flammula* γ *filiformis*) a broader-leaved but repent slender plant of Canadian river banks, a plant scarcely separable from *R. reptans* [*R. Flammula* var. *filiformis*] but somewhat broader-leaved than the typical form of the species [variety]."

67 RANUNCULUS HYDROCHAROIDES A. Gray

Glabrous or slightly appressed-pubescent aquatic or palustrine perennials; roots filiform or slender, 0.2-1 mm. in diameter; stems procumbent or floating or some of the flowering ones suberect, rooting at the lower or all the nodes, 1-2.5 dm. long, 1.5-4 mm. in diameter, 1-3-flowered, often fistulous in the aquatic forms; basal leaf blades simple, cordate, elliptic, or ovate to lanceolate, 0.5-2.8 cm. broad, entire or dentate or serrate, proximally truncate, subcordate, or angled and distally acute or somewhat rounded, the petioles 2-8 cm. long; cauline leaves alternate, like the basal but tending to be ovate-lanceolate or lanceolate, petioled; pedicels mostly 1-6 cm. long in flower, 3-8 cm. long in fruit, curved in fruit, glabrous or sparsely pubescent; sepals 5, greenish-yellow, spreading, ovate, 2-3 mm. long, 1.5-2 mm. broad, slightly longer than to half as long as the petals, early deciduous; petals 5-8 or 13, light yellow, 2-6 mm. long, 1-3 mm. broad, the nectary scale forming a pocket or at least a shallow one, glabrous; stamens 10-40; achenes 10-25 in a hemispheroidal or subglobose head 2-3 mm. in diameter, each achene obovoid, 1-4 mm. long, 1 mm. dorsoventrally, 0.5-0.7 mm. laterally, smooth, glabrous, the margin inconspicuous, the beak produced from the ventral side of the apex of the body, slender, 0.8-1 mm. long, straight, the stigma long-attenuate; receptacle pyriform-globose, 1 mm. long in flower, 1-2 mm. long in fruit, glabrous.

This species is related closely to *Ranunculus Flammula* L. and its varieties, and in some cases separation of the two species is difficult. The chief distinguishing feature of the two complexes is the achene beak, which in *R. Flammula* is nearly always 0.2-0.5 mm. long, broad, and truncate with the stigmatic surface mostly across the wide apex of the style. However, in some forms of *R. Flammula* var. *ovalis* (Bigel.) L. Benson and particularly in some plants from California, the style type approaches that described above for *R. hydrocharoides* and the length may be as much as 0.6 mm. In *R. Flammula* var. *filiformis* (Michx.) Hook. the beak is rarely as much as 0.7 mm. long. These two slender creeping varieties are distinguished readily from the similar entire-leaved creeping or floating type, *R. hydrocharoides* var. *typicus,* by the linear to oblanceolate to lanceolate basal leaves. *R. Flammula* var. *genuinus* of the Old World and of Newfoundland and Nova Scotia has the suberect habit, the stout stems, and the prevailingly lanceolate leaves of *R. hydrocharoides* var. *natans* of southern Mexico and Guatemala, but it may be distinguished readily by the stout truncate achene beaks only 0.2-0.3 mm. long, by the more complex inflorescence consisting of 2-25 flowers, instead of 1-3, and by presence of only 5 instead of 6-8 or 13 petals. *R. hydrocharoides* resembles also *R. ophioglossifolius* Villars of the Old World.

TABLE 13.—Varieties of *Ranunculus hydrocharoides* A. Gray.

Var. *typicus*	Var. *stolonifer*	Var. *natans*
Basal leaf blades ovate to cordate or some of them elliptic, 1.5-4 cm. long, 1-2.8 cm. broad, *entire*, the cauline leaves similar to the basal or the upper ones varying to ovate-lanceolate.	Basal leaf blades ovate to cordate or ovate-lanceolate, 2-3.5 cm. long, 1-2 cm. broad, *dentate*, the cauline leaves more elongate, ovate-lanceolate to lanceolate or elliptic-lanceolate.	Basal leaf blades ovate-lanceolate to lanceolate or rarely ovate, 1.5-6 cm. long, mostly 0.5-1 cm. broad, entire or serrate or denticulate, the cauline leaves similar but narrower and longer.
Petals usually 5 or up to 7, at maturity 20% to 100% longer than the sepals, 3-5 mm. long.	Petals 5 or up to 8, shorter or slightly longer than the sepals, 2-3 or 4 mm. long.	Petals 6-8 or 13, usually but not necessarily markedly exceeding the sepals.
Achenes about 10-25, 1.2-1.4 mm. long.	Achenes about 10-15, 1.1-1.3 mm. long.	Achenes about 15-25, about 1.5 mm. long.
California (above Owens Lake) to New Mexico; Baja California and Chihuahua.	Arizona and New Mexico; San Luis Potosi and Durango.	State of Mexico; Huehuetenango, Guatemala.

67a RANUNCULUS HYDROCHAROIDES var. **typicus**, nom. nov.*

R. hydrocharoides A. Gray, Mem. Amer. Acad. II. 5: 306. 1855.

Marshes, streams, and springs at 6,500 to 9,500 feet elevation. In the United States in the Sierran Forest above Owens Lake, California, and in the Rocky Mountain Forests in northern and eastern Arizona and in western New Mexico; Mexico in Baja California, Sonora, and Chihuahua.

Specimens examined.—CALIFORNIA: INYO CO. Owens Valley, *Kellogg* in 1874, *GH* (probably from the Sierra Nevada above Owens Lake.)

ARIZONA: Willow Spring, *Palmer 485, GH, Rothrock 217* in 1874, *GH, PA*: Thompson's Ranch, White Mountains, *Goodding 532, GH, Pom-B, UA, RM, NY*: Cooley's Ranch, *Goodding 1112, NY, RM, UA, Pom-B.* COCONINO CO. North of Flagstaff, *Whiting* in 1935, *UA*, Flagstaff, *Hanson A198* in 1922, *Ill, Mo.* APACHE CO. McNary, *Goodman & Hitchcock 1336, Mo;* 9 miles east of McNary, *Ferris 10115, DS, Pom-B;* Alpine Divide, White Mountains, *L. Benson 9539, Pom-B, UA.* GREENLEE CO. Summit south of Hannagan's meadows, White Mountains, *L. Benson 9512, Pom-B, UA.* COCHISE CO. Stevens Ranch, Huachuca Mountains, *Lemmon 2623* in 1882, *UC, PA;* Ft. Huachuca, *Lemmon 2623, GH, 2624, GH;* Chiricahua Mountains, *Blumer 17, UA*, Barfoot Park, Chiricahua Mountains, *Blumer 1555, UA, DS. RM, GH, Mo, Stone 508, RM, PA.*

NEW MEXICO: Duck Creek, tributary of the Gila River, *Greene 135* in 1880, *GH.* CATRON CO. Middle Fork of the Gila River, Mogollon Mountains, *Parker 2230, Pom-B;* Willow Creek 20 miles northeast of Mogollon, *Wolf 2645, Pom-B, GH, CAS, DS, Hitchcock, Rethke, & Raadshoven 4406, DS, Wash, WSC.* SOCORRO CO. Black Canyon, Diamond Bar Ranch, Gila National Forest, *Eggleston 16990, US.*

MEXICO. BAJA CALIFORNIA: Sierra de la Laguna, *Brandegee* in 1890, *UC*, in 1899, *UC;* La Chuparosa, *Brandegee* in 1892, *UC;* San Pedro Martir, *Brandegee* in 1893. *UC, F, Wiggins & Demaree 4907, DS, NY, Pom-B, S, GH, US.*

* Cf. Table 13.

SONORA: Mabibi, *Thurber, 441* in 1854, *GH, Mo, NY,* (type and isotypes, cf. below); El Potrero Rio de Santa Cruz, *Schott* in 1855, *F;* San Pedro River, *E. K. Smith, NY.*

CHIHUAHUA: Colonia Juarez, *E. W. Nelson 6019, GH, NY, US;* Pueblo Galleana, *Hartman 666, GH;* Colonia Garcia, *Townsend & Barber 30* in 1899, *GH, US, Pom-B, Mo, NY;* Madera, *Palmer 278* in 1908, *F, NY, US, GH, Mo; Pilsbry & Harvey* in 1935, *US;* Marsh Lake, *M. E. Jones* in 1903, *Pom;* Mound Valley, *M. E. Jones* in 1903, *Pom, US,* Arroyo Ancho, Dist. Guerrero, *Mexia 2601, PA, F, GH, Mich, UC, Mo, CAS, NY;* Majalca, *Lesueur 627* (aquatic), *UA-Shr, GH, Tex, F, 628* (palustrine), *F, GH, UA-Shr, Tex;* Moharachic, *Knobloch 8023, US.*

Type collection.—"In wet marshes, Mabibi, Sonora, June," *Thurber* in 1851. Type, *GH,* photographs *DS* and *Pom-B;* isotypes *Mo 212061, NY* (2 sheets, one labelled "Babibi" instead of Mabibi but with the same number on the label).

67b RANUNCULUS HYDROCHAROIDES var. STOLONIFER (Hemsl.) L. Benson,* Amer. Jour. Bot. 27: 187. 1940 (Liberal policy: *R. stolonifer* Hemsl.)

R. stolonifer Hemsl. Diagn. Pl. Nov. 17. 1879.

Marshy ground of springs and streams in the mountains at 6,000 to 8,000 feet elevation. Occurring in the Rocky Mountain Forests in the United States in forms intergrading with var. *typicus* in northern (Flagstaff) and eastern (White Mountains) Arizona and western New Mexico; Mexico in San Luis Potosí and Durango.

Specimens examined.—ARIZONA: Flagstaff, *MacDougal 246, Pom-B, NY, UA, UC, RM, PA, US.* A few other collections may be considered as intergrades to var. *typicus,* e. g., Lakeside, Navajo County, *Harrison 4472A, Sac;* Hannagan's Meadows, Greenlee County, *Kearney & Peebles 12290, Sac, 12290a, Sac.*

MEXICO: STATE UNKNOWN: *Schumann 251, F, US.* SAN LUIS POTOSÍ: San Luis Potosí, *Parry & Palmer 4* in 1878, *NY, Mo, GH, F, US, PA* (some of the sheets with very small palustrine plants) (isotypes, cf. below); *Schaffner 185* (*516* of Vigener's Herbarium) in 1879, *PA, Mich, F, US, NY, Pringle 3922, US, GH, F, NY, Mich, UC, Pom-B, WSC, Mo, PA;* Sierra de San Miguelito, south of San Luis Potosí, *Pennell 17706, US.*

DURANGO: *Palmer 960* in 1896, *NY, US, F, GH, UC, Mo.*

Type collection.—"Mexico, in regione San Luis Potosí, alt. 6,000-8,000 ped., Parry et Palmer, 4. (Hb. Kew.)." Isotypes, *NY, 212070, 212071, GH,* photograph *Pom-B, F 306560, US 1333, PA.*

67c **Ranunculus hydrocharoides** var. **natans** (Nees) L. Benson, comb. nov.* (Liberal policy: *R. vagans* S. Wats.)

R. natans Nees ex G. Don, Gen. Syst. 1: 31. 1831, not C. A. Mey. in 1830. *R. vagans* S. Wats. Proc. Amer. Acad. 26: 131. 1891. *R. stolonifer* Sessé & Mociño, Fl. Mex. ed. 2 (La Naturaleza vol. 2, appendix). 135. 1894, not Hemsl. in 1879. *R. Sessei* Briq. Ann. Conserv. & Jard Bot. Genève 11 & 12: 175. 1908. *R. hydrocharoides* var. *natans* L. Benson ex Standl. & Steyermark, Fieldiana 24(4): 252. 1946, *nom. nud.*

Streams, pools, and lake borders at 8,000 to 11,000 feet elevation. Mexico in the State of Mexico and Guatemala in Huehuetenango.

Specimens examined.—MEXICO: *Sessé, Mociño, Castillo, & Moldonado* in 1787, 1795, or 1804, *F 846480* (probably type collection of *R. natans* Nees, not C. A. Mey.,

* Cf. Table 13.

and *R. stolonifer* Sessé & Moc., not Hemsl., and isotype of *R. natans* Nees and *R. stolonifer* Sessé & Moc.); Flor de Maria, *Pringle 3177*, *GH* (type of *R. vagans*, cf. below), *UC 118310*, *HGr 2461*, *F 105266*, *US 1334*, *1335*, *305677*, *965821*, *1391420*, *NY*, *Mo*, *212074*, *PA* (isotypes); Tultenango, *Rose & Hay 5423*, *US*; Lake Lerma, *Pringle 5225*, *US*, *Pom-B*.

GUATEMALA: HUEHUETENANGO: Sierra de los Cuchumatanes, *Skutch 1260*, *NY*, *US*, *F*, *GH*, *Steyermark* in 1942, *Field Mus. Exped. 48309*.

Type collections.—(1) *R. natans*, "N. E. herb. Lamb." "Native of Mexico." Probably based upon the Sessé & Mociño collection in the Lambert Herbarium labelled as *R. natans* by Nees, as in the cases of *R. uncinatus* and probably *R. Donianus*. Isotype, *F 846480*, as cited above; probable isotype, *F 750807*. (2) *R. vagans*, "Found in shallow ponds near Flor de Maria in the State of Mexico, August, 1890 (n. 3177)" *C. G. Pringle*. Type, *GH*, photograph *Pom-B*; isotypes, *UC 118310*, *HGr 2461*, *F 105266*, *US 1334*, *1335*, *305677*, *965821*, *1391420*, *NY*, *Mo 212074*, *PA*. (3) *R. stolonifer*, "Habitat in Nemore de Chapultepec et Pratis Mexico vicinis." (4) *R. Sessei*, "Mexicum sine loco natali (Mociño et Sessé sub R. natans Moc. et Sessé)." Type photograph *F 750807*, rephotograph *Pom-B*; probable isotype, *F 846480*, photograph *Pom-B*. *R. lambertianus* D. Dietr. Syn. Pl. 3: 316. 1843, is attributed by Davis, Minn. Bot. Studies 2: 493. 1900, to this variety.

68 RANUNCULUS GORMANII Greene, Pittonia 3: 91. 1896

R. reptans L. var. *Gormanii* Davis, Minn. Bot. Studies 2: 498. 1900. *R. terrestris* Wynd, Torreya 30: 53. 1930, superfluous name.

Glabrous palustrine perennials; main roots slender, each with a small, light-colored, fusiform-thickened base; stems stoloniferous, rooting at 1-3 nodes, 5-12 cm. long, 0.5-1.2 mm. in diameter, 1-2-flowered, not fistulous, basal and cauline leaf blades simple, ovate or deltoid-ovate or rarely narrowly ovate, 20-30 mm. long, 15-22 mm. broad, entire, thin and flaccid, often 3-nerved, proximally truncate and distally usually acute, the petioles 2-4 cm. long, the stipular leaf bases about 5 mm. long; cauline leaves alternate, often several axillary ones developed at each node, petioled; pedicels 3-5 cm. long in flower, 3-6 cm. long in fruit, glabrous or thinly pubescent; sepals 5, yellow, spreading, narrowly obovate, 2-3 mm. long, about 1 mm. broad, glabrous, about half the length of the petals, promptly deciduous; petals 5, light yellow, 4.5-6 mm. long, 2-3 mm. broad, the nectary scale glabrous, forming a pocket about 0.5 mm. deep, usually truncate; stamens 10-20, the anthers plump; achenes 6-15 in a hemispheroidal cluster 2-3 mm. long and 2-3 mm. in diameter, each achene flattened-obovoid, 1.5-1.7 mm. long, 1.3-1.4 mm. dorsoventrally, 0.6 mm. laterally, smooth, glabrous, the margin fleshy and a little more prominent than in most members of this section, the beak rather stout, 0.6-0.7 mm. long, recurved at the tip; fruit-bearing portion of the receptacle globose, 1-2 mm. long in flower, 1.5-2 mm. long in fruit, glabrous.

Boggy mountain meadows at 2,000-2,500 meters; Sierran Subalpine Forest. Cascade Mountains from Lane and Deschutes counties, Oregon, to the Siskiyou and Marble Mountains, California. June and July.

Specimens examined.—OREGON: LANE CO. 6 miles west of Mackenzie Pass, *Hitchcock & Martin 4852*, *Pom-B*, *DS*, *Utah*, *Wash*; McKenzie Pass, *Detling 3122*, *WSC*, *Henderson* in 1934, *UO*, *CAS*; Lake Valley, *Sheldon 12457*, *DS*; Huckleberry Mountain, *J. W. Thompson 13034*, *Wash*, *PA*. DESCHUTES CO. Three Sisters, *Sweetser* in 1903, *UO*; Tumalo Creek, *Whited 612*, *WSC*, *1004*, *WSC*; eastern base of Brokentop Mountain, *Peck 14406*, *Pom-B*, *DS*, *Wash*, *WillU*; Century Drive, Todd

Lake, *Henderson 13905, PA, UO.* KLAMATH CO. Numerous collectors particularly at Crater Lake National Park.

CALIFORNIA: Sage Mill Meadow, *K. Brandegee UC, CAS.* SISKIYOU CO. Siskiyou Mountains, *Howell 19* in 1884, *GH;* Marble Mountain, *Chandler 1552, UC, GH, Mo* (in part), *DS.*

Type collections.—(1) *R. Gormanii*, "On moist banks at Cathedral Springs, Crater Lake, in southern Oregon, 22 Aug., 1896, collected by Mr. M. W. Gorman." Type, *HGr 2408;* isotype, *US 291540.* (2) *R. terrestris*, "The type has been deposited in the Herbarium of the University of Oregon as: — *Wynd, no. 2086*, Red Blanket Creek in the southwest corner of Crater Lake National Park." A superfluous and therefore invalid epithet admittedly duplicating *R. Gormanii* when published. Type, *UO.*

69 RANUNCULUS POPULAGO Greene, Erythea 3: 19. Feb. 1895

R. Cusickii Jones, Proc. Calif. Acad. II. 5: 615. Oct. 1895. *R. alismellus* (A. Gray) Greene var. *Populago* Davis, Minn. Bot. Studies 2: 496. 1900.

Flaccid and glabrous terrestrial perennials; roots each with a small, light-colored, fusiform-thickened area at the base, 1-2 mm. in diameter; stems 1 or 2, erect or reclining, not rooting, 1-4 cm. long, elongating rapidly in anthesis, 1-3 mm. in diameter, mostly 6-10-flowered, somewhat fistulous, the lowest internode often 15-20 cm. long; basal leaf blades simple, round-reniform to cordate-ovate or ovate, 3-5 cm. long, 3-6 cm. broad, usually denticulate, proximally cordate or truncate and distally acute or rounded, the petioles 4-12 cm. long, the stipular leaf bases 1-2 cm. long; cauline leaves opposite to alternate, ovate to nearly lanceolate, mostly sessile; pedicels 0.5-2 cm. long in flower, 3-8 cm. long in fruit, glabrous, the flowers commonly in true cymes of the type appearing above opposite leaves; sepals 5, green, spreading, narrowly obovate, 1.5-2.5 mm. long, 1-1.5 mm. broad, glabrous, half the length of the petals, early deciduous; petals 5, light yellow, obovate, 3-6 mm. long, 1.5-3 mm. broad, the nectary scale glabrous, forming a pocket 0.5 mm. deep, truncate; stamens 10-30; achenes 10-25 in a hemispheroidal head 2-3 mm. long and 3-4 mm. in diameter, each achene nearly rectangular to flattened-obovoid, 1.5 mm. long, 1.2 mm. dorsoventrally, 0.5 mm. laterally, smooth, glabrous, the margin inconspicuous, the beak stout, 0.6-0.7 mm. long, bent ventrally, receptacle pyriform-globose, 1-1.5 mm. long in flower, 2-3 mm. long in fruit, glabrous or pubescent.

Mountain meadows and bogs near timberline, the plants often flowering between snowbanks at 4,500 to 6,100 feet elevation; Sierran Subalpine Forest. Blue Mountains, southeastern Washington, to the Blue and Wallowa mountains in Umatilla, Wallowa, and Union counties, Eastern Oregon; in the Cascade Mountains from McKenzie Pass, Oregon, to the northern tip of Butte County, California; Siskiyou Mountains, California; mountains of Shoshone, Clearwater, and Idaho counties, northern Idaho. June and July. The apparent absence of this species south of the Salmon River in Idaho is surprising.

The species is related to *R. Gormanii* and *R. hydrocharoides*, and in its inflorescence type it has a marked resemblance to *R. alismaefolius* var. *montanus.*

Specimens examined.—WASHINGTON: Blue Mountains, *Horner 39, WSC.* COLUMBIA CO. Ridge dividing Mill Creek and North Fork, Wenaha Watershed, below Table Rock, Blue Mountains, *Constance, Clarke, Staats, & Van Vleet 1251, Pom-B, Mo.*

OREGON: Blue Mountains, *Nevius* in 1874, *GH* (in part). UMATILLA CO. 14 miles

east of Weston, *Peck 22232, CAS.* WALLOWA CO. Trout Creek (topotype), *Cusick 2214, HGr, UC, DS, RM, GH, WSC, UO; Mirror Lake, Peck 17780, DS, Maguire & Holmgren 26123* in 1946, *Pom-B;* Eagle Creek, *Cusick 1161, HGr, US,* photograph *Pom, GH, UO, NY, PA* (types and isotypes for *R. Populago* and *R. Cusickii,* cf. below). UNION CO. Northern Union County, *McCalla 5620, Pom-B;* Powder River, 5,000 feet, *Piper 2511, WSC, GH;* Tollgate Road, *Muenscher & Muenscher 15757, GH, Mo.* LANE CO. McKenzie Pass, *J. W. Thompson 49* in 1925, *Wash, 74, DS, Constance* in 1924, *UC* (atypical). JOSEPHINE CO. Upper Bigelow Lake, east of Oregon Caves, *Applegate 11255, Pom-B, DS;* Bolan Lake, Siskiyou Mountains, *J. W. Thompson 12501, Pom-B, UC, US, CAS, Wash, GH, Mo.* JACKSON CO. Siskiyou Peak (Jackson Co.), 2,000 meters, *Leiberg 4055, US, UO;* Ashland Butte, Siskiyou Mountains, *Cusick 2879, Pom-B, Pom, UC, Mo, DS, GH, Mo, Kildale & Gillespie 8045, DS, Peck 7038, GH, WillU.* KLAMATH CO. South Camp, Lake of the Woods, *Coville & Applegate 110* in 1897, *US;* Gearhart Mountain, *Applegate 7879, DS.*

CALIFORNIA: SISKIYOU CO. Siskiyou Mountains, *Howell* in 1884, *DS;* Mud Springs, Middlehell Creek, Siskiyou Mountains, *L. Wheeler 3685, GH, Mo;* Deadhorse Canyon, *M. S. Baker* in 1899, *UC.* BUTTE CO. Colby (probably near Colby Mountain just over the county line in Tehema County), *Austin* in 1896, *HGr, Mo, 180, NR;* Jonesville, Bassett in 1923, *UC, CAS, H. F. Copeland 1216* in 1929, *UC, DS, Pom, E. B. Copeland 640* in 1930, *UC, CAS, DS, Utah, RM, Wash, SD* (in part), *GH.*

IDAHO: SHOSHONE CO. Divide between St. Joe and Clearwater rivers, 1540 meters, *Leiberg 1216, US, Pom, UC, DS, NY, CAS, RM, GH, Mo;* Freezeout Mountain, *Sharsmith 3588, Pom, UC, CAS, DS, Wash, WSC, Utah, RM, US;* Hemlock Spring Forest Camp, *C. B. Wilson 297* in 1941, *WSC, 297A* in 1941, *ISB, WSC, Mo;* Little Lost Lake, *C. B. Wilson 312* in 1941, *WSC, ISB;* Spring-bog 4 miles southwest of Clarkia, *M. & R. Ownbey 2025, DS, CAS, US, Mo, Wash, Utah, GH.* CLEARWATER CO. 12 miles east of Wieppe, *Rust 1162, US.* IDAHO CO. Nez Perce National Forest, *Daubenmire* in 1938, *WSC, ISB;* Powell Ranger Station, *R. J. Davis 3641, WSC, ISB, Pom-B;* below Lolo Divide (Lolo Pass ?), *S. Watson 10* in 1880, *GH, US;* Bernard Lakes, *R. J. Davis 2306, Utah;* Obea Creek, Lolo Trail, *Constance & Pennell 2014, WSC;* Lolo Trail, *Piper 4081, WSC;* Frenchman Butte, *Daubenmire* in 1945, *WSC.*

Type collections.—(1) *R. Populago.* "A somewhat rare plant of the mountains of eastern Oregon and adjacent Idaho, distributed by Mr. Cusick and others under various names. . . ." Greene, Pittonia 3: 14. 1896, added the following statement, "RANUNCULUS POPULAGO, Greene, Eryth. iii. 19, has a synonym in *R. Cusickii,* Jones, Proc. Calif. Acad. n. ser. v. 615. Cusick's number 1161 is also my type of the species." Type, *HGr 2756;* isotypes, *GH, NY, US 926,* photograph *Pom, PA 714978, UO.* (2) *R. Cusickii,* "The type is No. 1161, Cusick, Eagle Cr., Or., 1884, 6000° alt." Type, probably *US 926,* photograph *Pom;* isotypes, *GH, HGr 2756, UO, NY, PA 714978.*

70 RANUNCULUS TEXENSIS Engelm. apud Engelm. & Gray, Bost. Jour. Nat. Hist. (Pl. Lindh.) 5: 210. 1845 (fide title page)

R. Flammula L. var. *laxicaulis* Torr. & Gray, Fl. N. Amer. 1: 16. 1838. *R. pusillus* Poir. var. *denticulatus* Torr. & Gray, *loc. cit. R. laxicaulis Darby,* Bot. S. States 204. 1855. *R. mississipiensis* Small, Bull. Torrey Club 27: 277. 1900. *R. laxicaulis* var. *mississipiensis* L. Benson, Bull. Torrey Club 69: 309. 1942.

Glabrous palustrine annuals; roots filiform; stems erect or reclining, rooting adventitiously at only the lowest nodes, 1-5 dm. long, 1-4 or 5-6 mm. in diameter, freely branching, fistulous; basal leaf blades simple, oblong, 6-18 mm. broad, dentate or entire, proximally truncate or rounded and distally truncate or obtuse, the petioles 1-7 cm. long, the stipular leaf bases 0.5 to about 1 cm. long; upper cauline leaves alternate, linear to lanceolate, oblanceo-

late or very narrowly elliptic, acute, 1.5-3.5 cm. long, 2-6 mm. broad, dentate, sessile; pedicels 0.4-2 cm. long in flower, 1-6 cm. long in fruit; sepals 5, greenish-yellow, spreading, ovate, 1.5-2.5 mm. long, about 1.5 mm. broad, glabrous or sparsely hairy, about half the length of the petals, promptly deciduous; petals 5 or rarely 6-10, yellow, 3-4 or up to 9 mm. long, 1.5-2 or 2.5 mm. broad, the nectary scale glabrous, forming a pocket 0.3-0.5 mm. long, truncate or prolonged a little on the margins; stamens 10-30; achenes 15-50 in a hemispheroidal head 2 mm. in radius or an ovoid head 2-4 mm. long and 2-2.5 mm. in diameter, each achene obovate to nearly circular, 0.6-0.7 mm. long, 0.6 mm. dorsoventrally, 0.3 mm. laterally, smooth and glabrous, the margin inconspicuous, the style 0.5 mm. long in anthesis, slender, deciduous in fruit, leaving a beak 0.1-0.2 mm. long; receptacle pyriform or spheroid, 1.5-2 mm. long in flower, 1.5-3 mm. long in fruit, glabrous.

Marshy ground and ditches at low elevations; Southeastern Pine and Riverbottom forests. Lowlands near the Mississippi River System from Paola, Kansas, eastward across Missouri and southern Illinois, southern Indiana, and northwestern Kentucky, thence southward to southeastern Texas and northern Georgia; Atlantic Coastal Plain at Milford, Connecticut, and from Snow Hill, Maryland, and Laurel, Delaware, to Georgia. April to June.

This species has been known long as *R. oblongifolius* Ell., which is a synonym of *R. pusillus* Poir. In the meantime, *R. laxicaulis* Darby, long treated as a synonym for *R. ambigens* S. Wats., was taken up by Fernald, Rhodora 41: 541-2. 1939 and later by the writer, Bull. Torrey Club 69: 308. 1942.

The plant recognized in an earlier paper as *R. laxicaulis* var. *mississipiensis* is characterized as follows: stem 3 or commonly 5-6 mm. in diameter; basal leaves ovate-acute, 3 cm. long, 2 cm. broad, strongly dentate; petals 6-10, 5-9 mm. long, 2-2.5 mm. broad. The typical form is as follows: stems 1-4 or 5 mm. in diameter, sprawling; basal leaf blades oblong to ovate-obtuse, 1-4 cm. long, 6-18 mm. broad, dentate or entire; petals 5, 3-4 or 7 mm. long, 1.5-2 mm. broad. Marshy ground at low elevations; River Bottom Forest. Lincoln County, Arkansas, and "Alluvions of Mississippi". Early Spring.

Specimens examined (for the entity in the paragraph above).—ARKANSAS: LINCOLN CO. Varner, *Bush 12* in 1898, *NY, GH* (this duplicate with only 5 petals).

MISSISSIPPI: "Alluvions," *Short* in 1840 (type of *R. mississipiensis*, cf. below). Previously this was noted as a rather poorly differentiated variety. The duplicate of the collection at Varner by Bush at the Gray Herbarium further weakens the status of this entity.

Significant specimens.—KANSAS: MIAMI CO. Paola, *Rusby* in 1877, *CAS.*

INDIANA: POSEY CO. Mt. Vernon, *Friesner 13330, CAS, Hermann 6645, GH;* Irwin Woods, 10 miles southwest of Mt. Vernon, *Deam 61315, Pom-B;* south of Carbon, *Deam 42945, GH, 46783, GH.* VANDERBURGH CO. *Deam 42948, Pom-B.* JEFFERSON CO. Hanover, *A. H. Young* in 1882, *PA.*

CONNECTICUT: Milford, *Harger* in 1886, *PA,* Setchell in 1887, *UC.*

MARYLAND: *Bebb* in 1863, *GH.* WORCESTER CO. Snow Hill, *Canby* in 1863, *GH, Tatnall 3391, GH, True 212, GH.* (On the peninsula a few miles south of the Delaware locality.)

DELAWARE: SUSSEX CO. Laurel, *Tatnall* in 1893, *GH.*

Type collections.—(1) Var. *laxicaulis*, "Milledgeville, Georgia, Dr. Boykin!" The writer has not located the collection by Boykin at the New York Botanical Garden or elsewhere. Fernald, Rhodora 38: 173-5. 1936, writes as follows, "The Boykin speci-

men, type of *R. Flammula β laxicaulis* is not at the Gray Herbarium and Dr. Gleason writes me that it cannot be found in the Herbarium of the New York Botanical Garden. Nor have I seen in either herbarium any material [of *R. ambigens*] from the Atlantic States from south of Delaware or Maryland, although there is a specimen without detailed data at New York said on the copied label to be from Georgia. This, however, is one of the many unlocalized sheets from Chapman, too many of which are open to doubt. The petals of *R. ambigens* only slightly exceed the sepals (sepals 5-7 mm. long, petals 5-8 mm. long); but Torrey & Gray described the 'petals . . . three times as long as the calyx.' They also had a 'weak much branched' plant with 'leaves all entire,' not a convincing description of the coarse stem (0.5-2 cm. thick at the base), simple or slightly forking, of *R. ambigens*, which has the middle and upper leaves toothed. Their description suggests *R. oblongifolius* Ell.; at least it is unwise to maintain *R. laxicaulis* for the undoubted *R. ambigens*." Fernald, Rhodora 41: 541-2. 1939, argued further as follows: "Both the original Torrey & Gray account of Boykin's plant and the fuller account by Darby are perfect descriptions of the plant erroneously passing as *R. oblongifolius*. This I intimated in 1936 (Rhodora, xxxviii. 175), when I showed that the name *R. laxicaulis* certainly does not belong to *R. ambigens* Wats. Although, as then stated, the type can not be found, the descriptions are so convincing to one who has followed through the surrounding vegetation the 'weak, much branched, declined' stems, 'rooting at the lower joints,' that I now have no hesitation in taking up for *R. oblongifolius* of authors, not Ell., the appropriate name of R. LAXICAULIS (T. & G.) Darby." (2) Var. *denticulatus*, "β Texas, Drummond." Isotypes, *NY*, *GH*. (3) *R. texensis*, "Margin of ponds, &c. near Houston. April." *F. Lindheimer*. "The collection of 1843 was made on Galveston Island, around Houston, on the Brazos, &c." The specimen at the Gray Herbarium is from Houston, April 1842, legit Lindheimer 1843. Type, *Mo;* isotypes, *NY*, *GH*, photograph *Pom-B*. (*PA*, Lindheimer in 1842, is not an isotype.) (4) *R. mississipiensis*, "ARKANSAS: Varner, Lincoln Co., April 28, 1898; *Bush*, no. 12. MISSISSIPPI: 'Alluvions.' 1840; *Peck*." In a conversation with the writer at the New York Botanical Garden about August 1, 1935, Dr. Small designated the Mississippi "Alluvions" specimen at the New York Botanical Garden as the type, cf. L. Benson, Bull. Torrey Club 69: 309. 1942. According to the writer's notes, it was collected by Short. (Cf. discussion of this entity above.)

71 RANUNCULUS PUSILLUS Poir.

Glabrous palustrine annuals; roots filiform; stems reclining, usually rooting at the lowest nodes, 1-5 dm. long, usually 1-3 mm. in diameter, freely branching, fistulous; basal and lower cauline leaf blades simple, oblong to ovate or rarely cordate, 6-30 or 50 mm. long, 5-15 mm. broad, entire or a little irregular, proximally truncate or rounded and distally truncate or rounded or acute, the petioles mostly 1-6 cm. long, the stipular leaf bases 0.5-1 cm. long; upper cauline leaves alternate, linear to lanceolate to oblanceolate, or very narrowly elliptic, 1-5 cm. long, 2-5 mm. broad, entire or sometimes dentate, sessile; pedicels 0.3-1.5 cm. long in flower, 1-6 cm. long in fruit, glabrous; sepals 5, greenish-yellow, spreading, ovate, 1-2 mm. long, 0.8-1 mm. broad, glabrous or sparsely hairy, slightly exceeding or equalling the length of the petals, promptly deciduous; the petals 1-3, yellow, obovate, 1-1.5 mm. long, 1 mm. broad, the nectary scale glabrous, forming a pocket 0.2 mm. deep, truncate; stamens 5-10; achenes 15-125 in a hemispheroid head about 4 mm. in diameter, an ovoid head 2-4 mm. long and 2-2.5 mm. in diameter or a cylindroid head 5-8 mm. long and 2-3 mm. in diameter, each achene oblong-obovate, 1 mm. long, 0.7 mm. dorsoventrally, 0.3 mm. laterally, smooth (with fine reticulations perhaps 0.03 mm. in diameter) or slightly or markedly papillate, glabrous, the margin inconspicuous, the style in anthesis 0.1-0.2 mm. long,

the achene beak 0.1-0.2 mm. long, receptacle pyriform or spheroid, 1.5-2 mm. long in flower, 1.5-3 mm. long in fruit, glabrous.

71a RANUNCULUS PUSILLUS var. **typicus,** nom. nov.

R. pusillus Poir. in Lam. Ency. Meth. 6: 99. 1804. *R. humilis* Pers. Syn. 2: 102. 1807. *R oblongifolius* Ell. Sketch. 2: 58. 1816. *R. pusillus* var. *muticus* Torr. & Gray, Fl. N. Amer. 1: 17. 1838. *R. pusillus* var. *oblongifolius* Torr. & Gray, *loc. cit. R. trachyspermus* Engelm. var. *Lindheimeri* Engelm. apud Engelm. & Gray, Bost. Jour. Nat. Hist. (Pl. Lindh.) 5: 211. 1845. *R pusillus* var. *Lindheimeri* A. Gray, Proc. Amer. Acad. 21: 367. 1886. *R. Bioletti* Greene, Pittonia 2: 225. 1892.

Lower leaves distally truncate or rounded; sepals 1-1.5 mm. long; achenes 15-50 in a hemispheroid head about 4 mm. in diameter or an ovoid head 2-4 mm. long and 2-2.5 mm. in diameter, smooth or slightly to markedly papillate; receptacle pyriform or spheroidal, 1.5-3 mm. long in fruit.

Shallow water of ditches and marshy ground at low elevations; California Oak Woodland; the Prairie; Deciduous, Southeastern Pine, and Riverbottom forests. Seaward North Coast Ranges of California from Humboldt County to the Santa Cruz Mountains and eastward to Napa County; Missouri to New York, southeastern Texas, and northern Florida. The disjunct distribution is of special interest, particularly in view of the occurrence of the endemic related species, *R. alveolatus* in Northern California.

Significant specimen.—FLORIDA: JEFFERSON CO. Newport, *Palmer 38496, GH.*

Type collections.—(1) *R. pusillus,* "Cette plante croît dans la Caroline, dans les lieux humides & marécagoux. Elle m' a été communique par M. Bosc, qui l'y a recueille." (2) *R. humilis,* "*R. pusillus* Poir. enc. bot. 6. p. 99. *R. Flammula* Walter. Hab. in Carol. humilis" (3) *R. oblongifolius,* "Collected 12 miles from Savannah on the Augusta road. St. John's Berkley. Dr. Macbride." According to Fernald, Rhodora 41: 542. 1939," ". . . When Mr. Long and I studied Elliott's material at Charleston in early April, . . . [we found] that the type of *R. oblongifolius* is characteristic large material of *R. pusillus.* . . ." Photographs, *GH, Pom-B* (kindness of Mr. Weatherby). (4) Var. *muticus,* "γ New York! to Pennsylvania." The specimen in the New York Botanical Garden, labelled Torrey, Flora of New York (abbreviated) has been designated as a lectotype, cf. Benson, Bull. Torrey Club 69: 310. 1942. Lectotype, *NY.* (5) Var. *Lindheimeri,* "Near Houston, etc. but not growing together with No. 2 [*R. trachyspermus*]," *Lindheimer* in 1843. Type, *Mo;* isotype, *GH,* photograph *Pom-B.* (6) *R. Biolettii,* "On Hood's Peak, Sonoma Co., California, May 1, 1889, Mr. F. T. Bioletti." Type, *HGr 2441.*

71b RANUNCULUS PUSILLUS var. ANGUSTIFOLIUS (Engelm.) L. Benson, Bull. Torrey Club 69:310. 1942 (Very liberal policy: *R. tener* Mohr)

R. trachyspermus Engelm. apud Engelm. & Gray, Bost. Jour. Nat. Hist. (Pl. Lindh.) 5: 211. 1845, not Ell. in 1816. *R. trachyspermus* var. *angustifolius* Engelm. apud Engelm. & Gray, *loc. cit. R. tener* Mohr, Contr. U. S. Nat. 6: 513. 1901.

Lower leaves commonly distally acute; sepals 1.5-2 mm. long; achenes 50-125, rarely fewer, in a cylindroid head usually 5-8 mm. long, densely and conspicuously papillate; receptacle cylindroid, 4-7 mm. long in fruit.

Ditches and marshy ground; probably Riverbottom Forest. Texas from Dallas southward and southeastward; western Louisiana; Auburn and Mobile, Alabama. April to June.

Specimens examined.—TEXAS: Hogbed (?) Prairie, *Wright, NY;* Chinango Jct., *Bush 66, Mo;* Raleigh, *Reverchon 2918* in 1903, *Mo, 3701, NY.* DALLAS CO. Dallas, *Reverchon* in 1874, *GH, 38* in 1875 *NY, Mo, PA, Curtiss, Mo.* GILLESPIE CO. *Jermy 219, Mo.* TRAVIS CO. Austin, *Tharp* in 1938, *Clo, GH.* BASTROP CO. *K. M. & M. C. Wiegand 592* in 1935, *GH, Tharp* in 1936, *GH.* CALDWELL CO. Seefge Swamp, Palmetto State Park, *Innes 647, GH.* COLORADO CO. Columbia (Columbus ?), *Bush 1255, GH, Mo, 42* in 1899, *GH, Mo.* JACKSON CO. Ganado, *Palmer 9231, US.* VICTORIA CO. Victoria, *Eggert* in 1900, *Mo.* MATAGORDA CO. Matagorda, *Palmer 4854, Mo, Pom.* HARRIS CO. Houston, *Lindheimer* in 1842, *Mo, GH* (type of *R. trachyspermus*, cf. below), in 1843, *Mo, GH* (type of var. *angustifolius*, cf. below), *E. Hall* in 1872, *NY, Pom, GH* (no locality given), *PA, Mo, Eggert* in 1899, *Mo;* between Fairbanks and Prairie View, *Innes & Warnock 675, GH;* Galveston, *Lindheimer* in 1843, *GH, Mo.* NUECES CO. Corpus Christi, *Heller 1457, NY.*

LOUISIANA: CALCASIEU PARISH. Pointe a la Hache P. O., *Langlois* in 1884, *NR.*

ALABAMA: MOBILE CO. Mobile, *Mohr* in 1896, *NY.* LEE CO. Auburn, *Earle & Baker* in 1897, *NY*, in 1898, *GH.*

Type collections.—(1) *R. trachyspermus*, "Margin of ponds near Huston, &c.," *Lindheimer.* Type, *Mo 1656;* isotype, *GH* (collected in April 1843, *legit Lindheimer* in 1843; Houston, Texas; numbered 2), photograph *Pom-B.* (2) Var. *angustifolius*, "Near Houston, etc. but not growing together with No. 2 [*R. trachyspermus*]," *Lindheimer* in 1843. The specimen is numbered 3. Type, *Mo 1655;* isotypes, *GH* (2 sheets), photograph *Pom-B.* (3) *R. tener.* Nom. nov. for *R. trachyspermus.*

72 RANUNCULUS ALVEOLATUS Carter apud Benson and Carter, Amer. Jour. Bot. 26: 555. 1939

Glabrous to sparsely-pubescent semi-aquatic annuals; roots filiform, numerous; stems many-branched from near the bases, semi-decumbent to erect, rooting at the lower nodes, 12-30 cm. long, 1-1.5 mm. in diameter, fistulous; leaves alternate, the blades simple, ovate to ovate-lanceolate, 6-20 mm. long, 4-12 mm. broad, entire to slightly dentate, the petioles of the lower cauline leaves 3-8.5 cm. long, the petioles of the upper cauline leaves 6-35 mm. long, the stipular leaf bases membranous-margined, non-ciliate or slightly ciliate at the apices, 4-6 mm. long, conspicuous; pedicels 5-10 mm. long in flower, 10-40 mm. long in fruit; sepals 3, membranous-margined at the bases, broadly to obtusely ovate, 2-2.5 mm. long, 1-1.5 mm. broad, glabrous, persistent; petals 2-3, yellow, clawed, the blades ovate, 2-2.5 mm. long, 1 mm. broad, the nectary scale glabrous, forming a pocket, truncate; stamens 4-5, 1.2-1.5 mm. long; achenes 15-25 in a slightly elongated head 3-5 mm. long and 3-4 mm. in diameter, each achene flattened-ovoid, 1.5 mm. long, 1.25 mm. dorsoventrally, 0.5 mm. laterally, the surface alveolate, the reticulations about 0.1 mm. in diameter, the margin obscure, the beak obscure; receptacle conical to narrowly ovoid, 1 mm. long in flower, 2-3.5 mm. long, 1.25-1.5 mm. in diameter in fruit, glabrous.

Margins of ponds and marshy areas along small streams up to 3,300 feet elevation; California Oak Woodland and Pacific Grassland. Sierra Nevada foothills from Calaveras County to Placer County, California. April and May.

Specimens examined.—CALIFORNIA: PLACER CO. Roseville, *Congdon* in 1894, *DS.* SACRAMENTO CO. 1½ miles southeast of Orangevale, *A. Carter 821, C, Pom-B, DS, GH, 1244, UC, Pom-B, Pom, DS, CAS, Utah,RM, Wash, Peirson, GH, Mo* (type and isotypes, cf. below); 1½ miles south of Alder Creek, *H. F. Copeland* in 1938, *GH;* Between Alder Creek and Ney School, *H. F. Copeland 1583, GH;* Folsom, *K. Brandegee* in 1907, *DS;* 8 miles east of Folsom, *A. Carter 1610, UC, Pom-B,*

Pom, Utah, RM, Wash, GH, WSC, Mo. SAN JOAQUIN CO. Elliott Road near Elliott, *Stanford 1462, RM, GH, CAS, DS.* CALAVERAS CO. Margin of pond 7.5 miles west of San Andreas, *J. T. Howell 4707, Pom-B, DS, UC, GH;* Salt Springs Valley, *J. P. Tracy 5665, UC.*

Type collection.—"The type specimen was collected between Fair Oaks and Folsom, 1½ miles southeast of Orangevale, Sacramento County, April 25, 1937, *Annetta Carter 1244 (Herbarium of the University of California No. 604080.)*" Type, *UC 604080;* isotypes *Pom-B 269846, Pom 257217, DS 266104, CAS 275535, Utah 38449, RM 183130,* photograph *Pom-B, Wash 90457* and *J. W. Thompson Herb. 21455, Peirson, GH, Mo 1191850, WSC 104166.*

73 RANUNCULUS FLAGELLIFORMIS J. E. Smith in Rees, Cyclop. 29: *R. sp.* no. 13. (pages not numbered, *Ranunculus* under R) 1819 (1813-16, acc. Wight, Fl. Alaska mss., *DS*)

Glabrous aquatic or sometimes subpalustrine perennials; roots filform, 1 mm. or less in diameter; stem an elongated sympodium, stoloniferous, reclining, rooting at all or nearly all of the nodes, 2-6 dm. long, 1-3 mm. in diameter, branching, with solitary flowers opposite the leaves; basal and cauline leaves and the bracts alike, alternate, simple, cordate or cordate-ovate, 1-5 cm. long, 1-4 cm. broad, entire or shallowly crenate, proximally cordate, distally rounded to subacute, the petioles 2-25 cm. long, the stipular leaf bases remarkably broad, flaring, 1 cm. long; pedicels 1-2 cm. long in flower, 2-4 cm. long in fruit, glabrous; sepals 3-4, greenish, spreading, elliptic, 2-3 mm. long, 2 mm. broad, glabrous, two-thirds the length of the petals, early deciduous; petals 5, the blades elliptic, about 2 mm. long, 1.5 mm. broad, the claws about 2 mm. long, the nectary scale forming a shallow pocket, glabrous; stamens about 10, the filaments short; achenes 20-25 in a subglobose head about 5 mm. in diameter, each achene elliptic-acute, biconvex, 2 mm. long, 1.5 mm. dorsoventrally, 1 mm. laterally, minutely reticulate-pitted, glabrous, the margin inconspicuous, the beak produced from the middle of the apex of the body, slender, 0.5-0.6 mm. long, straight; receptacle pyriform, 1 mm. long in flower, about 2 mm. long in fruit, glabrous.

Floating in shallow water of lakes, ponds, or streams or growing in the mud along the shore; 5,000 to 8,000 feet elevation. Mexico at Honey Station, Puebla; Guatemala; Costa Rica; Santo Domingo; southward to Chile and Argentina.

Specimens examined.—MEXICO. PUEBLA: Honey Station, *Pringle 8968, PA, US, Mo, UC, Crn, NY, GH, F, 15005, Mich, GH, UA-Shr, US.*

GUATEMALA. CHIMALTENANGO: Cerro de Tecpám, *Standley* in 1938, *Field Mus. Exped. 58712, F.*

JALAPA: Potero Carillo northeast of Jalapa, *Steyermark* in 1939, *Field Mus. Exped. 33038, F.*

SAN MARCOS: Quebrada Canjulá Volcán Tacaná, *Steyermark* in 1940, *Field Mus. Exped. 35969, F, NY;* Volcán Tajumulco, San Sebastián Road northeast of San Marcos, *Steyermark* in 1940, *Field Mus. Exped. 35595, US, F.*

COSTA RICA: Volcán de Turrialba, *Pittier 7551 (Herb. Nat. Costa Rica 13096), US, GH, Standley 35267, US;* Laguna de Reventado, *Pittier 14090, NY, Pom-B, US;* Vara Blanca to La Concordia, *Maxon & Harvey 8420, US; 8467, US;* Vara Blanca de Sarapiquí, *Skutch 3248, Mo, NY, GH, US;* La Palma, *Standley 32890, US;* Las Nubes, *Standley 38719, US, 38353, US;* Yerba Buena, northeast of San Isidro, *Standley 50045, US,* La Hondura San José, *Standley & Valerio 51807, US, F.*

SANTO DOMINGO: Rio Yaque, Prov. de la Vega, *Fuertes 1728, GH, NY;* Las Lagunas, *Fuertes 1903, NY, GH;* Constanza, *Turckheim 3029, Mo, GH, US, NY.*

Type collection.—"Native of Chile and New Granada. We have specimens from Mutis and Cavanilles. . . ."

Sect. 5 HECATONIA (Lour.) DC.

Hecatonica as genus, Lour. Fl. Cochinch. 1: 370. 1790.

Hecatonica, as section, DC. Prodr. 1: 30. 1824.

Xanthobatrachium, as subsection, Prantl in Engl. Bot. Jahrb. 9: 266. 1888.

Xanthobatrachium, as section, L. Benson, Amer. Jour. Bot. 23: 173. 1936.

Glabrous or sometimes hairy palustrine or aquatic annuals or perennials. Stems branching. Leaves submerged and filiform-dissected or floating or aërial and lobed, parted, or divided. Sepals green or yellowish. Petals 5 or rarely as many as 8, yellow, the nectary scale either forked ventrally and produced distally on each side along the blade of the petal, or completely surrounding the nectary, or bearing the nectary in a pocket on its own ventral surface. Achenes 10-300 in a cluster or an ovoid or cylindroid head, the dorsoventral measurement of each 2-6 times the lateral; the pericarp smooth or roughened, often corky-thickened on the periphery or the keel, glabrous. Receptacle of most species markedly enlarged in fruit.

Type species, *Hecatonia palustris* Lour.

KEY TO THE SPECIES

1. Styles and achene beaks practically lacking, the stigmas nearly sessile; achene with or without corky thickening of the pericarp.
   2. Achenes smooth on the faces; receptacle not more than 5 mm. long in fruit; perennials; stem rooting at the lower nodes. (The *Ranunculus hyberboreus* group.)
      3. Leaves not cordate at the bases; achenes 10-20; receptacle usually but slightly enlarged in fruit, 1.5 or rarely 2-3 mm. long .....74. *R. hyperboreus.*
      3. Leaves (at least some of them) cordate at the bases; achenes 20-60; receptacle greatly enlarged in fruit, 3-5 mm. long .....75. *R. natans.*
   2. Achenes marked on each face by either minute rough transverse ridges or by a circle of "pin pricks" at the inner margin of the peripheral pericarp thickening; annuals; stems very rarely rooting; receptacle greatly enlarged in fruit, 2.5-9 mm. long. (The *Ranunculus sceleratus* group.) .....76. *R. sceleratus.*
1. Styles and achene beaks well-developed, the beaks at least half as long as the achene bodies, 0.6-1.5 mm. long; achene with conspicuous corky thickening of either the keel or the pericarp beside the keel. (The *Ranunculus Gmelinii* group.)
   2. Achenes each with corky thickening beside the inconspicuous keel (especially in the basal and ventral regions); leaves once- or twice-parted or -lobed, pentagonal, 1-2 cm. long, 1.5-2.5 cm. broad, rarely dissected but not triternately so; anthers elliptic, 0.5-1 mm. long; petals 4-7 mm. long .....77. *R. Gmelinii.*
   2. Achenes each with a conspicuous corky keel; leaves of aquatic specimens finely triternately dissected into ribbon-like segments 1-2 mm. broad, the complete blades 1.5-10 cm. long, 2-12 cm. broad; anthers oblong, 1-1.5 mm. long; petals 7-15 mm. long .....78. *R. flabellaris.*

74 RANUNCULUS HYPERBOREUS Rottb. Skrift. Kjoeb. Selsk. 10: 458. 1770

R. hyperboreus f. *fluitans* Porsild, Meddel. Grønl. 50: 375. 1912. *R. aquatilis* L. var. *arcticus* Durand, Pl. Kan. No. 1, App. to E. K. Kane, Arctic Expl. 2nd. Grinnell Exp. in Search of Sir John Franklin 1853, 54° 55'. 2: 1856. *R. hyperboreus* var. *Turquetilianus* Polunin, Canadian Nat. Mus. Bull. (92): 211. *pl. 6. lower left. f. b.* 1940.

Glabrous palustrine or rarely aquatic perennials; roots filiform; stems reclining and rooting at the nodes, 3-15 cm. long, about 1 mm. in diameter, some of them branching, not fistulous; basal and cauline leaf blades simple, broader than long, 3-8 mm. long, 7-10 mm. broad, 3-lobed, the lobes entire or sometimes the lateral lobes notched at the apices, the lobes obtuse and the sinuses acute, proximally truncate or rounded, distally rounded, the petioles 1.5-5 cm. long, the stipular leaf bases 0.5-1 cm. long; cauline leaves alternate, mostly petioled; pedicels 0.5-2 cm. long in flower, 1-4 cm. long in fruit; sepals greenish-yellow, spreading, ovate, 2-3 mm. long, 2 mm. broad, glabrous, the length of the petals, deciduous after the petals; petals 5, yellow, obovate, 2-3 or 4 mm. long, 1.5-2 mm. broad, the nectary scale glabrous, its margins prolonged into the blade of the petal; achenes 10-20 in a globose cluster 3-5 mm. long and 2.5-4 mm. in diameter, each achene obovate, 0.7 mm. long, 0.6 mm. dorsoventrally, 0.3 mm. laterally, smooth, glabrous, the margin obscure, the beak slender, 0.1 mm. long, not recurved; receptacle globose, 1 mm. long in flower, 1.5 mm. long in fruit, glabrous.

Aquatic, subaquatic, or palustrine, "in moist places, for instance, in moss at the springs, in small pools, [in Greenland] in manured soil" (Porsild, Meddel, Grønl. 58: 79. 1920); boreal regions; Arctic and Alpine Grassland and Tundra. Circumpolar; from the Aleutian Islands and northern Alaska along the shore and islands of the Arctic Ocean to Newfoundland and Greenland; Heart Lake, Alberta; Gulf of St. Lawrence, Quebec; Old Hollowtop, near Pony, Montana. July to August.

Significant specimens.—ALBERTA: Heart (Raup) Lake, 59° 41' N. 111° 56' W. *Raup 2368, Can.*

QUEBEC: Gulf of St. Lawrence. Boat Island, Saguenay County, *H. F. Lewis* in 1927, *Can.*

MONTANA: MADISON CO. Old Hollowtop, Tobacco Root Mountains, near Pony, *Rydberg & Bessey 4109, NY.*

Type collections.—(1) *R. hyperboreus, Greenland.* (2) Var. *arcticus* referred here by Porsild, Meddel. Grønl. 58: 79. 1920. (3) *F. fluitans,* "Neighborhood of Prøven 7 the northern district of Umanaq . . . occurs in pools." (4) Var. *Turquetilianus,* "Type in the British Museum: "*Nicholas Polunin,* Chesterfield, Keewatin, No. 2217, August 20, 1936." Same data on Polunin Aug. 19-20, *2215, GH* (probably an isotype, since Polunin's numbers have no apparent connection with the system in use in the United States). The specimen is a scrap without flowers or fruit. The epithet applied to the specimen apparently replaced by *Turquetilianus.* Same data on Polunin, Aug. 19-20, *2234, Can;* probably also an isotype. Topotype, Vicariat de S. E. Mgr. Turquetil, Chesterfield Inlet, south entrance, apparently at Chesterfield, *Dutilly 346,* Aug. 6, 1936, *Can.* This form has the following characters: leaves divided and again parted and lobed, the ultimate lobes or divisions linear, sharply acute. Possibly a variety, but this is dubious.

Hultén, Fl. Alaska & Yukon, Lunds Univ. Arrsk. II. 40 (1): 758. 1944, refers two specimens, "Nome, [G. N.] JONES 9083 (L, H) [also *Wash*]; Pt. Hope, [J. P.] ANDERSON 3794 (H)," to subsp. *samojedorum* (Rupr.) Hult., characterized

by ". . . its small, caespitose growth and . . . the more forward turned lobes of the leaves."

75 RANUNCULUS NATANS C. A. Mey.

Flaccid and glabrous aquatic or rarely palustrine perennials; roots filiform; stems floating, rooting at the nodes, 1-4 dm. long, 0.7-1.5 mm. in diameter, freely branching; leaves almost all cauline, alternate, the blades simple, reniform, 4-15 or 25 mm. long, 7-25 or 30 mm. broad, 3-lobed or -cleft, the lateral lobes again 2-lobed, the 5 major lobes toothed or entire, the ultimate lobes rounded, the sinuses acute, open or closed, the blade proximally cordate, distally rounded, the petioles 1-5 cm. long, the stipular leaf bases 2-3 mm. long; pedicels 5-15 mm. long in flower, 1-3 cm. long in fruit; sepals greenish-yellow, spreading, ovate, 3-4 mm. long, 2 mm. broad, the length of the petals, promptly deciduous; petals 5, yellow, obovate, 3-4 mm. long, 2 mm. broad, the nectary scale glabrous, forming a pocket 0.7-1 mm. broad and 0.1 mm. deep, truncate; achenes 20-60 in a globose or ovoid head 4-7 mm. long and 3-5.5 mm. in diameter, each achene obovate, 1 mm. long, 0.7 mm. dorsoventrally, 0.4-0.5 mm. laterally, smooth, without peripheral thickening, glabrous, the beak stout, 0.2 mm. long, not recurved; receptacle ovoid, 1-2 mm. long in flower, 3-5 mm. long in fruit, glabrous or sparsely hirsutulous.

75a RANUNCULUS NATANS C. A. Mey. var. **typicus,** nom. nov.

R. natans C. A. Mey. in Ledeb. Icon. 2: 114. 1830. *R. hyperboreus Wahl.* var. *natans* Regel, Reisen Ost-Sib. 1: 43. 1861.

Leaves up to 25 mm. long and 30 mm. broad, the middle lobes and the lateral secondary lobes toothed, the sinuses closed or very narrow; receptacle sparsely hirsutulous.

Aquatic in ponds and ditches. Siberia and Central Asia. Summer.

Type collection.—"Hab. in aquis stagnantibus ad fl. Tscharysch. in fl. Mön et Tegagon in fl. Tschiya influentibus." Flora Rossicam-Altaicam.

75b **Ranunculus natans** var. **intertextus** (Greene) L. Benson, comb. nov. (Very liberal policy: *R. intertextus* Greene)

R. intertextus Greene, Ottawa Nat. 16: 33. 1902.

Leaves commonly 4-15 mm. long and 7-25 mm. broad, the five major divisions (middle primary and lateral secondary) simple and entire, rounded, the sinuses not closed, acute; recpetacle glabrous.

Ponds and lakes at 6,500 to 9,000 feet elevation in the central Rocky Mountains and at lower elevations northward; Rocky Mountain Subalpine Forests. Nordegg, Alberta; occasional from central Idaho to western Montana and northern Wyoming; Colorado from Boulder County to Mineral and Fremont counties. July and August.

Significant specimens.—ALBERTA: Nordegg, *Brinkman 3835, NY.* IDAHO: Beaver Canyon, *Rydberg* in 1895, *NY.* LEMHI CO. Panther Creek, *Hitchcock & Muhlick 9428, Wash, Pom-B;* Meyers Cove, *R. J. Davis 1415, ISB, Pom-B, Utah;* 8-mile Creek, Lemhi River Valley, *Henderson 4022, US.* CUSTER CO. Squaw Creek, *Macbride & Payson 3372, RM, Pom, NY, CAS, UC, GH, DS, Mo, US.*

ELMORE CO. (?). Headwaters, West Fork of Camas Creek, *Rust 789, US.* FREMONT CO. *E. B. & L. B. Payson 1976, Mo.*

MONTANA: RAVALLI CO. Darby, *M. E. Jones* in 1909, *Pom.* DEER LODGE CO. Warm Springs Creek near Anaconda, *M. E. Jones* in 1905, *Pom, UC.* GALLATIN CO. Gallatin Canyon, *Blankinship 20* in 1905, *US.*

WYOMING: East Fork, *A. Nelson 1113, RM, Ill, GH, US.* YELLOWSTONE NATIONAL PARK. Yancey's, *A. & E. Nelson 5895, RM, Pom, DS, Ill, GH, Mo, US;* Camp Roosevelt above Yellowstone Bridge, *Conard 1372, RM.* TETON CO. Snake River, *L. Williams 980, CAS, RM, GH, Mo;* Adams Ranch, Jackson Hole, *Merrill & Wilcox 968* in 1901, *RM, GH, US.* JOHNSON CO. Headwaters of Clear Creek and Crazy Woman River, Bighorn Mountains, *Tweedy 3380, RM, WSC.* CONVERSE CO. (?). Union Pass, *A. Nelson 808, Ill;* Cold Spring, Union Pass, *A. Nelson 2918, RM.*

Type collections.—(1)*R. intertextus*, "Common almost throughout the Rocky Mountains, as an aquatic of subalpine ponds and swamps." "Hitherto referred to R. natans of Europe." The following collection is desgnated as a lectotype: Upper Bear Creek, Colorado, *Greene* in 1889. Lectotype, *HGr 2682*, photograph *Pom-B.*

76 RANUNCULUS SCELERATUS L.

Glabrous or rarely hirsute palustrine or rarely aquatic annuals; roots fleshy, about 1 mm. in diameter; stems erect, rarely rooting, 1-5 or 10 dm. long, 2-15 mm. in diameter, profusely branching, fistulous, inflated, the juice acrid, said to raise blisters on human skin; basal leaf blades simple, reniform, 1-3 or 6 cm. long, 1.5-5 or 10 cm. broad, deeply 3-parted or -divided, the primary parts or divisions lobed, parted, or divided, the ultimate lobes obtuse or rounded, the sinuses rounded, the blades proximally cordate and distally rounded, the petioles 3-12 or rarely 25 cm. long, the stipular leaf bases 5-10 mm. long, broad; cauline leaves alternate, the bracts often oblanceolate and entire, sessile; pedicels 0.3-2 cm. long in flower, 1-3 cm. long in fruit; sepals 5, greenish-yellow, spreading, ovate, usually 2-3 mm. long, 1.5-2 mm. broad, pilose or glabrous, at least three-fourths the length of the petals and usually exceeding them, persisting later than the corolla; petals 5, light yellow, obovate, 2-3 or 5 mm. long, 1-2 or 3 mm. broad, the nectary scale glabrous, the margins prolonged along the blade of the petal, sometimes 1 or both with a free flap at the tip, or the scale often completely surrounding the nectary; stamens usually 10-25; achenes 40-300 in a cylindroid head 3-10 mm. long and 2-6 mm. in diameter, each achene obovoid, 0.8-1 mm. long, 0.6 mm. dorsoventrally, 0.3 mm. laterally, often with minute, irregular transverse ridges in the central unthickened portion of each face, the periphery of the pericarp at least somewhat corky-thickened, the surface with transverse ridges or a circle of "pinprick" depressions at the inner margin of the thickened zone, glabrous, the marginal keel obscure, the style and the achene beak almost lacking, 0.1 mm. long, not recurved; receptacle obovoid or cylindroid, 1-2 mm. long in flower, 2.5-9 mm. long in fruit, pubescent or sometimes glabrous.

76a RANUNCULUS SCELERATUS var. **typicus,** nom. nov.

R. sceleratus L. Sp. Pl. 551. 1753. *R. eremogenes* Greene var. *longissimus* Lunell, Amer. Midl. Nat. 1: 206. 1910. *R sceleratus* var. *longissimus* L. Benson, Bull. Torrey Club. 69: 313. 1942.

Glabrous or rarely somewhat hirsute palustrine annuals; basal leaf blades deeply 3-parted or -divided, the primary parts or divisions usually merely lobed;

cauline leaves with the primary divisions mostly oblanceolate and apically toothed; achenes with minute, irregular transverse ridges on the central unthickened portion of each face, the periphery of the pericarp at least somewhat corky-thickened.

Borders of lakes and marshland at low elevations; Pacific Forest; the Prairie; Deciduous, Southeastern Pine and Riverbottom forests. Old World; naturalized about Seattle and the Islands of Puget Sound, Washington, and Portland, Oregon; native or naturalized from Alberta and eastern North Dakota to Labrador and Newfoundland and southward to Louisiana and Georgia; mostly coastal in New England. June to September.

Significant specimens.—WASHINGTON: Tide Marsh, *J. M. Grant* in 1922, *GH.* ISLAND CO. Deception Pass State Park, Whidby Island, *H. W. Smith 1417, Wash.* KING CO. Green Lake, Seattle, *G. N. Jones 6134, Wash;* Mercer Island, *Eastwood 9952, CAS.* CLARK CO. Vancouver, *Henderson* in 1888, *NR.*

OREGON: CLATSOP CO. Astoria, *Henderson 11737, UO.* MULTNOMAH CO. Opposite Vancouver, Washington, *Henderson 1760* in 1885, *NR.* Columbia Beach, Portland, *Gorman 3636, WSC;* Albina, Portland, *Suksdorf 2880, WSC, 3075, WSC, Sheldon 10584, DS, Pom, GH, Mo.* HOOD RIVER CO. *Henderson 875* of 1924, *GH, UO, Mo.*

CALIFORNIA: SAN JOAQUIN CO. Stockton, *E. E. Stanford 185, OSC.*

Type collection.—(1) *R. sceleratus*, "*Habitat ad* Europae *fossas & paludes.*" (2) Var. *longissimus*, "In running water. Leeds [North Dakota], June 27, 1909. Plant rooting from the nodes with long, slender fibers, the lower leaves very long-petioled." (Quoted from the label of the type specimen, *Minn 257628.*) Collected by Lunell. Since there is no fruit, this plant may prove to be var. *multifidus.* Adventitious rooting from the stem is rare in immersed plants of var. *typicus*, but it does occur, as shown by the following collections: OHIO: Oberlin, *Dick* in 1894, *GH.* WISCONSIN: Fox Lake, *Hale* in 1861, *GH.* MASSACHUSETTS: Somerville, *Miller & Greenman 578, GH.* The plant from Leeds, North Dakota, has the following characters: glabrous aquatic; stem producing long filiform roots, exceeding 7 dm. in length above the point of breaking (when collected); leaves all cauline, 1.8-2.3 cm. long, 3-4.3 cm. broad, 3-parted, the parts broadly cuneate, again 3-7-lobed or -cleft, the lobes rounded; petioles from the submersed nodes up to 35 cm. long; mature fruit unknown.

76b RANUNCULUS SCELERATUS var. MULTIFIDUS Nutt. in Torr. & Gray, Fl. N. Am. 1: 19. 1838, not *R. multifidus* Forsk. in 1775 or Pursh in 1814 (Very liberal policy: *R. eremogenes* Greene)

R. eremogenes Greene, Erythea 4: 121. 1896. *R. eremogenes* var. *degener* Greene, Pittonia 4: 144. 1900. *R. eremogenes* var. *pilosulus* Greene, Pl. Baker. 3: 2. 1901. *R. eremogenes* var. *pubescens* Lunell, Bull. Leeds Herb. (2): 6. 1908. *R. sceleratus* var. *eremogenes* Garrett, Spring Fl. Wasatch Reg. 25. 1911. *R. sceleratus* subsp. *multifidus* Hult. Fl. Alaska & Yukon, Lunds Univ. Arssk. II. 40(1): 768. 1944.

Glabrous or sometimes thinly hirsute; palustrine; basal leaf blades usually with the primary parts or divisions again deeply parted or divided; cauline leaves with the divisions narrowly cuneate, apically lobed; pericarp smooth except for a circle of minute "pin prick" depressions on each face.

Borders of lakes, ponds, and streams at 3,000 to 6,500 feet elevation; mostly Sagebrush Desert, Juniper-Pinyon Woodland, and the Plains Grassland; best developed in the Great Basin and the Great Plains as far south as California (northeastern Siskiyou County and Modoc County), Nevada, and Colorado; Gila River at Sacaton, Arizona; Puget Sound; Rio Arriba and

Grant counties, New Mexico; eastward to Manitoba and the northern edge of Iowa. May to August.

Significant specimens.—ALASKA: Eagle Summit, Steese Highway, 109 miles north of Fairbanks, *Scamman 202, GH;* Fairbanks, *Scamman 1733, GH;* Norton Sound, 63° 15′ N, 161° W, *A. E. & R. T. Porsild 1083, Can, GH;* Matanuska, *J. P. Anderson 1659, NY;* Talkeetna, *J. P. Anderson 7737, Pom-B, ISC;* Franklin, Forty-mile District, *J. P. Anderson 7262, ISC, Pom-B;* Gakona, *J. P. Anderson 8605, Can.* YUKON: White Horse Pass, *Macoun, Geol. Surv. Can. 58343, NY, Can;* Lower Labarge, *J. P. Anderson 1656, NY;* Dawson, *Eastwood* in 1914, *CAS, Malte 106* in 1916, *GH, Can.* MANITOBA: Churchill, *A. E. Porsild 5451, Can, 5452, Can, Polunin 1902* in 1936, *Can;* MacGregor, *Macoun & Herriot* in 1906, *Geol. Surv. Can. 69799, Can;* Branton, *Macoun* in 1896, *Geol. Surv. Can. 12313, Can.* WASHINGTON: Puget Sound. SAN JUAN CO. Stuart Island, *Lawrence 152* in 1904, *Wash, WSC, Pom-B;* Blakely Island, *Roush* in 1919, *DS.* WHATCOM CO. Birch Bay, *Muenscher 7862, GH.* SKAGIT CO. Fidalgo Island, *H. W. Smith 1501, WSC.* ISLAND CO. Whidby Island, *Mason 5315, UC, Pom-B, H. W. Smith 2059, WSC.* SNOHOMISH CO. Camano Island, *Gardner* in 1895, *UC.* KING CO. Golden Gardens, Seattle, *J. W. Thompson 5229, Wash.*

ARIZONA: PINAL CO. Gila River at Sacaton, *Peebles & Harrison 2002, Sac, Peebles 9413, Sac, 15127, Pom-B.*

NEW MEXICO: RIO ARRIBA CO. Opposite San Juan, *Heller 3763, HGr, NY.* GRANT CO. Mangas Springs, 18 miles northwest of Silver City, *Metcalfe* in 1901, *Pom, UA, RM, 127* in 1903, *Pom, NY, UA, RM, GH.*

NEBRASKA: *Hayden* in 1854, *Mo* in 1857, *Mo.* Downey Lake 35 miles south of Valentine, *Tolstead 208* in 1936, *GH.* HOOKER CO. Middle Loup River near Mullen, *Rydberg 1333, NY;* Dismal River, Sandhills, (Hooker Co. ?), *Pool* in 1912, *Mo.*

MINNESOTA: HUBBARD CO. La Salle Springs, Itasca Park, *Moyle 161, NY, GH.* in 1930, *UC.* HENNEPIN CO. *Burglehaus* in 1891, *Wash;* Minneapolis, *Herrick* in 1878, *NY.* DAKOTA CO. Lakeville Lake, *Sheldon* in 1894, *Pom.* NICOLLET CO. Swan Lake, *Ballard* in 1892, *NY, UC, RM, GH.*

IOWA: *Arthur* in 1875, *Mo.* DICKINSON CO. Swan Lake, Lake Okoboji, *Conard* in 1923, *Wash.* CLAY CO. Dan Greene Slough, *A. Haydon 2078, GH;* Lake Township, *A. Haydon 2078, Mo.*

Type collections.—(1) Var. *multifidus*, "Ponds of the Platte, Nuttall." Isotype, *GH* (Elias Durand Herb.), photograph *Pom-B.* (2) *R. eremogenes*, "Plant of wet springy places and margins of pools in the West American desert region, through the Great Basin, and to southeastern Oregon and Northwestern British America; the American counterpart of the Old World *R. sceleratus*, to which it has been erroneously referred, being the *R. sceleratus*, var. *multifidus* of Nuttall. . . . Though first detected by Nuttall on the plains of the Platte, the most luxuriant specimens seen by me are from the region of the muddy lakes that lie along the northwestern border of the Great Basin in northeastern California and adjacent Oregon. Smaller specimens, with leaves more finely divided were collected beyond the British boundary, on Milk River Ridge, by Mr. Macoun, in 1895 (n. 10036). . . ." Apparently *R. eremogenes* was intended as a nomen novum for *R. sceleratus* var. *multifidus*, and that is the interpretation of the writer. Therefore, Nuttall's collection from "Ponds of the Platte" has been taken as the type of *R. eremogenes*, cf. L. Benson, Bull. Torrey Club 69: 312-13. 1942. (3) Var. *degener*, "Obtained in southern Colorado, in the summer of 1899, by C. F. Baker, perhaps near Pagosa Springs, but the label has been lost." *HGr 2929* and *2930* have C. F. Baker's Pagosa Springs labels and these two sheets have been designated as a lectotype, cf. L. Benson, *loc. cit.* 213. Isotype, *UC 118321.* (4) Var. *pilosulus*, "In damp places above Gunnison, 17 July, n. 454." *C. F. Baker.* The type specimen in the Herbarium Greeneanum is not numbered with the stamp used on the other sheets. The following is quoted from the label, "in damp spots in bottoms." Isotypes, *Pom 150095, RM 33098*, photograph *Pom-B, 171250*, photograph *Pom-B, Mo, GH.* (5) Var. *pubescens*, Leeds, Lunell.

77 RANUNCULUS GMELINII DC.

Glabrous or hirsute palustrine or aquatic perennials; roots slender but fleshy, about 1 mm. in diameter; stems reclining or sometimes floating, prostrate, rooting at the nodes, usually 1-5 dm. long, 0.5-3 mm. in diameter, usually a little branched, commonly 1-4- or up to 50-flowered, usually fistulous; leaves all cauline and alternate or the basal present and longer-petioled, the blades pentagonal in outline, 0.8-2 cm. long, 1.5-2.5 cm. broad or rarely up to 6-9 cm. in diameter, very rarely larger, deeply 3-parted or -divided, the divisions 2-3-times forked or sometimes dissected into ribbon-like divisions, the blade when dissected *not triternately* dissected as in the dissected leaves of *R. flabellaris*, proximally deeply cordate and distally rounded, petioles 1-3 or 4 cm. long, stipular leaf bases 3-6 cm. long; pedicels 1-2.5 cm. long in flower, 2-4 cm. long in fruit, glabrous or appressed-pubescent; sepals 5, yellowish-green, spreading, ovate or nearly orbicular, 2.5-6 mm. long, 1.5-5 mm. broad, glabrous or pubescent, half as long to nearly the length of the petals, usually thick, deciduous with or before the corolla; petals 5, yellow, circular or obovate, 4-7 mm. long, 3-6 mm. broad, the nectary scale variable, its margins prolonged into flaps, the tips of which are usually free from the petal and joined, thus the scale usually encircling the gland, or sometimes as in *R. flabellaris*, or the margins joined distally, glabrous; stamens 20-40, the anthers mostly 0.5-1 mm. long, ellipsoid; achenes 50-70, in an ovoid head 5-7 mm. long and 4-6 mm. in diameter, each achene flattened-obovoid, 1-1.5 mm. long, 1-1.2 mm. dorsoventrally, 0.3 mm. laterally, smooth, glabrous, the margin often inconspicuously keeled, the keel not corky-thickened, but the basal and ventral portions of the pericarp callous-thickened, the beak broad and thin, 0.6-0.8 mm. long, recurved; receptacle ovoid or obovoid, 1-2 mm. long in flower, about 4 mm. long in fruit, hairy.

77a RANUNCULUS GMELINII var. **typicus**, nom. nov.*

R. Gmelinii DC. Syst. 1: 303. 1818. *R. Purshii Richards.* var. *Gmelinii* D. Don in G. Don, Gen. Syst. Gard. 1: 33. 1831 *R. yukonensis* Britt. Bull. N. Y. Bot. Gard. 2: 169. 1901. *R. Purshii* subsp. *yukonensis* A. E. Porsild, Rhodora 41: 229. 1939. *R. Gmelinii* var. *yukonensis* L. Benson, Bull. Torrey Club 69: 314. 1942.

Pools, lakes, or streams; Northern and Rocky Mountain forests. Northern Russia; Siberia; northern Mongolia; northern and central Alaska to Keewatin and Peace River, Alberta; rare in northern Minnesota.

Specimens examined.—ALASKA: Point Barrow, *Murdock 83* in 1883, *GH;* Wainwright, *J. P. Anderson 4366, ISC;* Kiwalik River, north coast Seward Peninsula, *A. E. & R. T. Porsild 1469, Can;* Buckland River, north coast Seward Peninsula, 66° N, 161° 4′ W, *A. E. & R. T. Porsild 1571, Can, GH;* Pastolik River, Yukon River Delta, *Newhall* in 1899, *UC;* Pastolik, Norton Sound, 63° 22′ N, 163° W, *A. E. & R. T. Porsild 997, Can, GH;* Unalaklet, Norton Sound, 63° 52′ N, 160° 20′ W, *A. E. & R. T. Porsild 1153, Can, GH;* Holy Cross Mission, Yukon River, 62° 13′ N, 159° 45′ W, *A. E. & R. T. Porsild 825, GH;* Takotna, *J. P. Anderson 7353, ISC, Pom-B;* north side of the Kokrines Mountains, 65° 20′ N, 154° 30′ W, *A. E. & R. T. Porsild 735, Can;* Wiseman, Middle Fork of the Koyukuk River, ca. 67° N, 150° W, *Scamman 2254, GH;* Circle Hot Springs, near Steese Highway, 133 miles

* Cf. Table 14.

TABLE 14.—Varieties of *Ranunculus Gmelinii* DC.

Var. *typicus*	Var. *limosus*	Var. *Hookeri*
Sparsely to markedly hirsute.	Markedly pubescent.	Glabrous or essentially so.
Stems 0.5-2 dm. long, 0.5-1 mm. in diameter.	Stems mostly 1-2 dm. long, 0.7-1 mm. in diameter.	Stems 1 or usually 2-5 dm. long, 1.5-3 dm. in diameter.
Leaf blades 0.8-1.2 or 1.5 cm. in diameter, 3-parted or -divided and again 3-lobed to -parted, usually finely dissected into linear, acute divisions.	Leaf blades 0.8-1.5 mm. long, 1-1.7 cm. broad, usually 3-parted and again once or twice lobed, the segments usually broad and rounded or obtuse apically, but sometimes dissected.	Leaf blades 1-2 cm. long, 1.5-2.5 cm. broad, very rarely larger, deeply 3-parted or -divided, the divisions again 2-3 times forked or sometimes dissected into ribbonlike divisions.
Sepals 2.5-3 mm. long.	Sepals about 2.5-3.5 mm. long.	Sepals 4-6 mm. long.
Petals obovate - oblanceolate to obovate, 3.5-4 mm. long, 1.5-2 or 3 mm. broad.	Petals broadly obovate to orbicular, 4-5 mm. long, 3.5-5 mm. broad.	Petals orbicular or obovate, 4-7 mm. long, 3-6 mm. broad.
Northern and central Alaska to Keewatin and Peace River, Alberta; rare in northern Minnesota.	Eastern British Columbia and Alberta and rare eastward to Manitoba and adjacent North Dakota; rare in Washington, Idaho, Montana, Utah, and Colorado; Asia.	Central Alaska and the Yukon to Newfoundland and Nova Scotia; southward to eastern Oregon, northern Nevada, Utah, New Mexico, North Dakota, Iowa, Michigan, and Maine.

north of Fairbanks, *Scamman 198* in 1936, *GH;* Goldstream Creek and Pedro Dome, 51 miles north of Fairbanks, *A. E. & R. T. Porsild 133, Can;* Mile 30, Steese Highway, *J. P. Anderson 2627, ISC;* Igloo Creek, Mt. McKinley National Park, *A. & R. Nelson W2146, RM;* Talkeetna, *J. P. Anderson 7648, ISC, Pom-B, PA;* Eklutna, *J. P. Anderson 6937, ISC, Pom-B;* Chitina, *J. P. Anderson 2030, ISC,* College, *J. P. Anderson 1241, ISC;* Northway Airbase, *J. P. Anderson 9085, Can.*

YUKON: Herschell Island, *Johansen 219* in 1914, *Can;* Dawson, *Eastwood 202* in 1914, *CAS, Pom, Clo, UC, GH, Can, Malte* in 1916, *Can, Purer 7632, DS, SD;* Bonanza Creek, Dawson, *R. S. Williams* in 1899, *NY, GH* (type and isotype of *R. yukonensis*, cf. below), *Eastwood 510* in 1914, *CAS;* Mouth of Klondike River, *Macoun* in 1902, *Geol. Surv. Can. 58338, Can, GH;* Klondike, *MacLean* in 1898-1901, *Pom, UC, GH, US* (1901 crossed out).

MACKENZIE: Cape Bathhurst, 70° 35′ N, 128° 6′ W, *Johansen 545* in 1916, *Can;* Liverpool Bay, Nicholson Island, 70° N, 129° W, Arctic Coast, *A. E. & R. T. Porsild 2876, Can;* Atkinson Point, 70° N, 131° 20′ W, *A. E. & R. T. Porsild 2608, Can;* Mackenzie River Delta, north end Richardson Island, 69° 30-40′ N, 134° 40′ W, *A. E. & R. T. Porsild 2220, Can;* Mackenzie River Delta, East Branch, 68° 40′ N, *A. E. Porsild 6881, Can;* north of Campbell Lake, Mackenzie River, east of Separation Point, 68° 20′ N, 133° 30′ W, *A. E. & R. T. Porsild 1918, Can; Eskimo Lake Basin,* north shore of second lake, 69° 132° 30′ W, *A. E. & R. T. Porsild 2982, Can;* Kittigazut, Arctic Coast, 69° 20′ N, 133° W, *A. E. & R. T. Porsild 2487, Can;* Great Bear Lake, McTavish Arm, Conjurer Bay, 65° 50′ N, 117° 15′ W, *A. E. & R. T. Porsild 3693, Can.*

KEEWATIN: Yathkyed or Hikolikdjuak Li on Kazan River, 62° 30′ N, 97-98° 30′ W, *A. E. Porsild 5805, Can, 5807, Can;* Lake on Tha-anne River, 60° 58′ N, ca. 97° W, *A. E. Porsild 5584, Can;* Sarpik Island, Hudson Bay near Churchill, *Dutilly 4303, Can.*

ALBERTA: Peace River Landing, *Macoun* in 1903, *Geol. Surv. Can. 59521, Can, GH, Mo, US.*

MINNESOTA: *F. L. & C. E. Moore* in 1898, *RM 136037.* SAINT LOUIS CO. "Fall Lake," Vermilion Lake, lat. 48°, *L. H. Bailey 441* in 1886, *GH;* Tower, Vermilion Lake, *E. J. Hill 198, Ill, Lakela 3946, WSC.* ITASCA CO. *Burglehaus 137* in 1891, *Wash 7816.*

Type collection.—(1) *R. Gmelinii,* "Hab. in omni Sibiriâ (Gm.)." (2) *R. yukonensis,* "Mouth of the Bonanza [Creek, Dawson], June 18, 1899, R. S. Williams (type.)" Type, *NY;* isotype, *GH.*

77b RANUNCULUS GMELINII var. LIMOSUS (Nutt.) Hara,* Rhodora 41: 386. 1939. (Very liberal policy: *R. limosus* Nutt.)

R. limosus Nutt. in Torr. & Gray, Fl. N. Amer. 1: 20. 1838. *R. multifidus* Pursh var. *limosus Lawson,* Rev. Canad. Ranunc. 47. 1884.

Mud and water of shallow lakes and streams; mostly in the mountains. Chiefly in the Rocky Mountain System; eastern British Columbia and Alberta; rare eastward to Manitoba and adjacent North Dakota; rare or uncommon in Washington, northern Idaho, and nearly Montana; southeastern Idaho and adjacent Utah; Twin Lake, Colorado. Summer.

Specimens examined.—BRITISH COLUMBIA: Upper Hat Creek, Marble Mountains, *J. W. & E. M. Thompson 356, Wash 48479* (intergrade and extreme form matted together on *J. W. Thompson Herb. 17424*), *Pom-B;* Chilcotin, *Newcombe* in 1915, *GH;* Charlie Lake, *Cowan* in 1938, *GH;* Butter Ridge, west end of Rocky Mountain Portage, 56° 3′ N, 122° 11′ W, alt. 2300 ft., *Raup & Abbe 4328, GH, Can;* Kootenai Lake, *Murray* in 1944, *WSC.*

ALBERTA: Government Hay Camp dist., Slave River, 59° 31′ N, 111° 28′ W, Wood Buffalo Park, *Raup 2379, GH;* Thomas Lake, *Macoun* in 1906, *Geol. Surv. Can. 69797, Can, CAS, GH;* Jasper, *McCabe 8313, Pom-B.*

SASKATCHEWAN: Torchwood Hills, *Macoun* in 1872, *Can.*

MANITOBA: Clear Lake, Riding Mountain National Park, *Scamman 2891, GH.*

WASHINGTON: KLICKITAT CO. Bingen, *Suksdorf 2424* in 1895, *WSC, GH.* STEVENS CO. Mission, *Kreager 414, Clo, GH, 494, Utah, Wash.*

IDAHO: BOUNDARY CO. Copeland, *Ehlers & Erlanson 173, Clo.* BEAR LAKE CO. Shores of Bear Lake, Montpelier, *Greene,* July 30, 1889, *UC 13967;* Fish Haven, *R. J. Davis 1594, ISC, Pom-B.*

UTAH: Northen Utah, *S. Watson 24* in 1869, *GH.* SUMMIT CO. Bear River, *Goodman 1905, GH.*

MONTANA: Midvale, *Umbach 219* in 1903, *Pom, RM.* MISSOULA CO. Near Missoula, *Barkley & Kramer 1909, Clo, Wash, Mo, PA, WSC.* Seeley Lake, Blackfoot Valley, *Kirkwood 2114 UC, Clo.* PARK CO. Wilsall, *Suksdorf 489, WSC, 779, WSC.*

COLORADO: Twin Lake, *Wolf & Rothrock 117* in 1873, *GH.*

NORTH DAKOTA: BOTTINEAU CO. Lake Metigoshe State Park, *Stevens 640, Clo.* BENSON CO. Leeds, *Lunell* in 1900, *GH.*

Type collection.—"Margins of ponds in the eastern Ranges of the Rocky Mountains, Lewis's River, &c. . . . Nutt." Isotypes, *NY, GH* ("Platte Plains," *Nuttall* but "Oregon, Tolmie," written in pencil among the specimens), photograph *Pom-B, GH* (Nuttall collection from "R. Mts.," No. 4, Elias Durand Herbarium probably not the type collection since the specimen is labelled *R. delphinifolius*).

* Cf. Table 14.

77c **Ranunculus Gmelinii** var. **Hookeri** (D. Don) L. Benson, comb. nov.,* neither *R. Hookeri* Schlect in 1834 nor Regel in 1861. (Liberal policy: *R. Purshii* Richards.)

R. Purshii Richards. Bot. App. Frankl. 1st. Jour. ed. 1. 751. 1823. *R. fistulosus* Pursh ex Torr. Ann. Lyc. N. Y. 2: 163. 1826, as syn. *R. Purshii* var. *Hookeri* D. Don in G. Don, Gen. Syst. Gard. 1: 33. 1831. *R. Purshii* var. *repens* Hook. ex D. Don, *loc. cit.*, not *R. repens* L. in 1753, not *R. multifidus* Pursh var. *repens* Hook. ex S. Wats. in 1871. *R. Purshii* var. *terrestris* Ledeb. Fl. Ross. 1: 35. 1842. *R. multifidus* Pursh var. *terrestris* A. Gray, Man. ed. 5. 41. 1867, not *R. Purshii* var. *terrestris* Ledeb. in 1842. *R. mutifidus* Pursh var. *repens* Hook. ex. S. Wats. in King, Rept. U. S. Geol. Expl. 40th. Par. 5: 8. 1871, not *R. repens* L. in 1753, not *R. Purshii* var. *repens* D. Don in 1831. *R. limoso x sceleratus* Greene, Pittonia 2: 65. 1890. *R. lacustris* Beck & Tracy var. *terrestris* McMillan, Metasp. Minn. Valley 247. 1892, based on *R. multifidus* var. *terrestris* A. Gray. *R. delphinifolius* Torr. var. *terrestris* Farwell, Ann. Rept. Comm. Parks & Boulev. Detroit 11: 63. 1900, based on var. *terrestris* A. Gray. *R. delphinifolius terrestris* Piper, Contr. U. S. Nat. Herb. 11: 272. 1906, based on var. *dissectus* A. Gray. *R. Purshii* var. *dissectus* Lunell, Bull. Leeds Herb. (2): 6. 1908. *R. Purshii* var. *geranioides* Lunell, *loc. cit. R. Purshii* var. *radicans* Lunell, *loc. cit. R. delphinifolius* f. *terrestris* Blake, Rhodora 15: 164. 1913, based on var. *terrestris* A. Gray. *R. Purshii* var. *prolificus* Fern. Rhodora 19: 135. 1917. *R. Gmelinii* var. *Purshii* Hara, Rhodora 41: 386. 1939. *R. Gmelinii* var. *prolificus* Hara, *loc. cit. R. Gmelinii* var. *terrestris* L. Benson, Bull. Torrey Club 69: 313. 1942, based on *R. Purshii* var. *terrestris* Ledeb.

Mud or shallow water of lakes, stream borders, and marshes up to 5,000 or 6,500 feet elevation. From central Alaska and the Yukon River to the Great Slave Lake and Newfoundland to Nova Scotia; southward to Eastern Oregon (Klamath Lake), Nevada (Humboldt Wells), Utah (rare), northern New Mexico, North Dakota, Minnesota, Michigan, Iowa, and Maine (Aroostook County). Late May to August.

A form with the following characters is occasional across the northern part of the continent: stems upright; larger cauline leaves 4-5 cm. long, 5-6 cm. broad; flowers paniculate, about 7-50 per stem; bracts numerous and well-developed. This plant has been described as *R. multifidus* Pursh var. *terrestris* A. Gray and various later combinations (but not *R. Purshii* Richards. var. *terrestris* Ledeb. or *R. Gmelinii* DC. var. *terrestris* L. Benson, based upon it), *R. limoso x sceleratus* Greene, and *R. Purshii* var. *prolificus* Fern. (*R. Gmelinii* var. *prolificus* Hara). This type is approached by *R. Purshii* var. *dissectus* Lunell. It appears to be a sporadic form rather than a definite natural population. Plants of this tendency are as follows (it is to be noted that some of these specimens lack the bracts characteristic of the extreme form):

ALBERTA: Lesser Slave Lake, *Moss 2221, WSC* (with few bracts).

QUEBEC: Grindstone, Magdalen Islands, *Fernald, Bartram, Long, & St. John 7482, GH, NY* (type and isotype of var. *prolificus*, cf. below).

IDAHO: BEAR LAKE CO. Shore of Bear Lake, near Montpelier, *Greene* in 1889. *HGr, US, NY* (type and isotypes of *R. limoso x sceleratus*, cf. below).

MONTANA: GALLATIN CO. Belgrade, *E. J. Moore* in 1900, *GH;* Bozeman, *Blankinship* in 1899, *GH.*

COLORADO: LARIMER CO. Ft. Collins, *C. F. Baker* in 1895, *Pom 150026.*

NORTH DAKOTA: BENSON CO. Leeds, *Lunell* June 18, 1906, *Minn, photograph Pom-B* (type of *R. Purshii* var. *dissectus*, cf. below).

* Cf Table 14.

IOWA: Spirit Lake, *Cratty* in 1920, *GH*.

ILLINOIS: Chicago, *Munroe* in 1877, *Pom*.

MICHIGAN: ALPENA CO. Alpena, C. *F. Wheeler* in 1895, *GH*. INGHAM CO. Michigan State Agricultural College, C. *F. Wheeler* in 1894, *GH*, in 1895, *GH*. WASHTENAW CO. Ann Arbor, Clark in 1862, *GH* (type of *R. multifidus* var. *terrestris*, cf. below).

Significant specimens.—ALASKA: Eklutna, *J. P. Anderson 6936, ISC, Pom-B, PA;* Matanuska, *J. P. Anderson 1660, NY;* Livengood, *J. P. Anderson 8990, Can;* Northway Airbase, *J. P. Anderson* in 1944, *Can;* Rat River above Ft. Yukon, *Kennicott, NY* (not checked since 1935).

MACKENZIE: Ft. Resolution, Great Slave Lake, *E. Taylor* in 1892, *GH;* Smith Portage, Slave River, *Dayton* in 1892, *Can*.

MANITOBA: Churchill, Hudson Bay, *Macoun, Geol. Surv. Can. 79053, NY, GH, Polunin 2079* in 1936, *GH;* Lumsden, *Macoun, Geol. Surv. Can. 12308, HGr*.

OREGON: Along the Columbia River and as follows: KLAMATH CO. Fort Klamath, *Austin & Bruce 1767, DS, Pom, Leiberg 643* in 1894, *Pom, US, UC, GH, Peck 9535, WillU, Wash, Mo, GH;* Klamath Agency, *Peck 16796, WillU;* Klamath Lake, *Newberry* (Pac. R. R. Surv. Calif. & Ore.), *US*.

NEVADA: ELKO CO. Humboldt Wells, *Heller 9186, NY, Mo*.

UTAH: Bear River Valley (Rich or Summit Co.), *Hermann 5780;* Kingston, *M. E. Jones 5322* in 1894, *Pom;* Rockport, *M. E. Jones* in 1886, *Pom*. SUMMIT CO. West of Bear River, *E. B. & L. B. Payson 4847, Pom*. SEVIER CO. Fish Lake, *Maguire 16158* in 1938, *GH, 19980* in 1940, *Utah*.

NEW MEXICO: Ft. Defiance, *Palmer* in 1869, *US, GH*. RIO ARRIBA CO. Canjilon Divide, 9,000 feet, *Goodwin 1047, US*. COLFAX CO. Ute Park, *Standley 14261, US;* Cimarron Canyon, *Castetter 1988, RM*.

Type collections.—(1) *R. Purshii*, "(W. B.)" "(W) Denotes the wooded country from lat. 54° to 64° north." (B) Denotes the Barren Grounds from Point Lake to the Arctic Sea." Collected by Richardson. (2) *R. fistulosus*, "Ranunculus Purshii. Found also on the barren grounds of Arctic America by Dr. Richardson, who supposes it to be the *R. fistulosus* of Pursh. ined. in Herb. Lambert." (3) Var. *Hookeri*, "Native of lakes and marshes about Slave Lake, Cumberland House. Hook. fl. bor. amer. p. 15. t. 7. f. B. 1." Hooker's *R. Purshii* var. β, "β. and γ. Lakes and marshes about Slave Lake, Cumberland House Fort. *Dr. Richardson:* and to the Rocky Mountains. *Drummond.*" Possible isotypes: *GH* (sheet from Herbarium of J. Gay purchased by Dr. Hooker, var. β), *GH* (sheet labelled "N. W. Amer.," *Franklin Exped.* Dr. Hr. [Hooker], labelled *R. Purshi* β; two specimens—one distinctly var. *Hookeri*, the other tending toward var. *limosus* but the lower leaves dissected as figured by Hooker; the plant moderately hairy and the leaves small). (4) Var. *repens* D. Don, "Found along with the preceding variety." "Hook. fl. bor. amer. p. 15. t. 7. f. B. 1." Var. γ, see above. Possible isotype, *GH*, photograph *Pom-B*. (5) Var. *terrestris* Ledeb., "Hab. ad sin. Eschscholtzii in plaga artica Americae boreali-occidentalis! (Chamiss., Eschscholtz, Hook. et Arn.)" "R. Purshii Hook. l. c. var. γ ? — Hook. et ARN. in BEECHEY'S *Voyage* p. 121. R. Gmelini SCHLECT. *Animadv. in Ranunc.* II, p. 35 (excl. syn. GMEL. et LEDEB. speciminibusque a Redowskio lectis)." (6) Var. *terrestris* A. Gray, "Ann Arbor, Michigan, on muddy banks, Miss Clark." Type, *GH*, photograph *Pom-B*. (7) Var. *repens* Hook. ex S. Wats., "Var. δ REPENS, Hook." Cf. Hook. Fl. Bor. Amer. 1: 15. 1829, "(TAB. VII. B. Fig. 3.) — R. Purshii, β. *Rich. l. c.* — R. Gmelini. *De Cand. Prodr. v.* 1. *p.* 35. (excl. syn Schlect.)—R. Langsdorfii. *De Cand. Prodr. v.* 1, *p.* 34. — Ranunculus foliis duplicato-trifidis, caulibus filiformibus declinatis. *Gmel. Fl.* Sib. v. 4. t. 83. B. . . . δ. Bear Lake, Dr. Richardson. Bay of Eschscholtz, on the western shore of extreme Arctic America. *Chamisso.*" D. Don in G. Don, Gen. Syst. Gardening 1: 33. 1831, interpreted this variety of Hooker as being based upon *R. Gmelinii* DC., and his new combination, *R. Purshii* var. *Gmelinii* rests upon this interpretation of Hooker's var. δ. Watson's var. *repens* attributed to Hooker

is based upon the same one of Hooker's unnamed varieties. The writer is inclined to interpret this varietal name as being based upon the plant figured by Hooker, *pl. 7 f. B 3*, which is one of the forms of *R. Gmelinii* var. *Hookeri*, the plant both Hooker and Watson actually were describing. (8) *R. limoso x sceleratus*, "I obtained it in July last, on the muddy shores of Bear Lake, near Montpelier, Idaho." *Greene* in 1889. Type *HGr 1171;* isotypes, *US 890*, photograph *Pom-B, NY*. (9) Var. *dissectus*. "The lobes just as deeply cut [as in var. *schizanthus*], but the segments broader (as in **Geranium dissectum L.**) The prevalent land form." The specimen collected by Lunell "In margine paludis" at Leeds, Benson County, North Dakota, June 18, 1906 has been designated as a lectotype, cf. L. Benson, Bull. Torrey Club 69: 314. 1942. Lectotype, *UM 257716*, photograph, *Pom-B*. (10) Var. *geranioides*, "The lobes not as deeply cleft, and the segments still broader than in var. *dissectus* (the leaf resembles in outline **Geranium molle L.**)" The specimen collected at Leeds, North Dakota, June 16, 1900, *Lunell 445* has been designated as a lectotype, cf. L. Benson, *loc. cit.* Lectotype, *UM 257708*, photograph *Pom-B*. (11) Var. *radicans*, "Creeping, and rooting repeatedly from the nodes. Leaves mostly the form of var. **geranioides.**" The specimen collected in mud on the peninsula of Lake Ibsen, Benson County, North Dakota, July 6, 1908 by Lunell has been designated as a lectotype, cf. L. Benson, *loc. cit.* Lectotype, *UM 299854*, photograph *Pom-B*. *R. Purshii* var. *humifusus* Lunell, Amer. Midl. Nat. 4: 358. 1916, is a new name for *R. radicans* Regel, Reisen in den Süden von Ost-Sibirien or Pl. Radd. 1: 44-5. 1861. It is based upon an Old World type, as follows: "Am nördlichen Ufer des Baikel auf sumpsigen Wiesen." (12) Var. *prolificus*, "MAGDALEN ISLANDS: Wet meadow, Grindstone, July 22, 1912, *Fernald, Bartram, Long, & St. John*, no. 7482. (TYPE in Gray Herb.)" Type, *GH* (2 sheets), photograph *Pom-B;* isotypes, *NY, Can* (not floriferous like the type).

78 RANUNCULUS FLABELLARIS Raf. apud Bigel.

Amer. Mo. Mag. 2: 344. March, 1818

R. multifidus Pursh. Fl. Amer. Sept. 2: 736. 1814, not Forsk. in 1775, not *R. sceleratus* var. *multifidus* Nutt in 1838. *R. fluviatilis* Bigel. Fl. Bost. ed. 1. 139. 1814, not Willd. in 1799. *R. delphinifolius* Torr. in A. Eat. Man. Bot. ed. 2. 395. May or later, 1818, cf. Fern. Rhodora 38: 171-3. 1936. *R. lacustris* Beck & Tracy in A. Eat. Man. Bot. ed. 3. 423. 1822. *R. Purshii* Richards. var. *multifidus* D. Don in G. Don, Gen. Syst. Gard. 1: 33. 1831. *R. missouriensis* Greene, Erythea 3: 20. 1895. *R. delphinifolius* f. *submersus* Gluck, Beih. Bot. Cent. 39 (2): 328. 1923. *R. delphinifolius* f. *terrestris* Gluck, *loc. cit. R. flabellaris* f. *riparius* Fern. Rhodora 38: 171. 1936.

Glabrous or rarely hirsute aquatic or occasionally palustrine perennials; roots filiform, about 0.2 mm. or more thick; stems floating or reclining, rooting at the lower nodes, 3-7 dm. long, 2-4 mm. in diameter, branching, fistulous; leaves all cauline, alternate, the blades finely *triternately* dissected, semicircular to reniform in outline, 1.5-10 cm. long, 2-12 cm. broad, the numerous divisions ribbon-like and 1-2 mm. broad, not dissected in palustrine specimens, in which the leaves are merely parted or divided and with the divisions again lobed or parted, the petioles 3-8 mm. long, composed wholly of the stipular leaf bases, pedicels 1-5 cm. long in flower, 2-6 cm. long in fruit, glabrous or hairy; sepals greenish-yellow, spreading, ovate, 5-8 mm. long, 4-6 mm. broad, usually glabrous, half the length of the petals, early deciduous; petals 5-8, yellow, obovate, 7-15 mm. long, 4-12 mm. broad, the nectary scale glabrous, free laterally, the gland in a pocket on the *ventral* surface *of the scale;* stamens 50-80, the anthers 1-1.5 mm. long, oblong; achenes 50-75 in an ovoid head 7-10 mm. long and 5-8 mm. in diameter, each achene obovate, 2 mm. long, 1.3 mm. dorsoventrally, 0.4-0.5 mm. laterally, smooth, glabrous, the margin conspicuously thickened into a corky keel, the achene beak broad and flat,

1.5 mm. long, straight; receptacle ovoid-cylindroid, 2-3 mm. long in flower, 5-7 mm. long in fruit, hairy.

Shallow water or mud; found up to 4,800 feet elevation in the West; Kelowna and Wardner, British Columbia, and Alberta (Red Deer) to Eastern Washington, Eastern Oregon and the lower Columbia River, to Humboldt, Mendocino, Modoc and Plumas counties, California, to northern Nevada, and to northern Utah; eastward to Ontario, Quebec, Maine, Pennsylvania, and New Jersey; south in the Mississippi Valley to Louisiana and on the Atlantic Coast to southeastern Virginia. Summer.

Juvenile leaves of this species resemble those of the terrestrial species of the Section *Chrysanthe*, since they are reniform in outline, deeply 3-parted (almost divided), the divisions being again cleft and then lobed, the blades measuring up to 2.5 cm. long and about 4 cm. broad (cf. Shook Post Office, Wayne County, Missouri, *Steyermark 6586, Mo;* Wilderness, Oregon County, Missouri, *Steyermark 11952, Mo*). The transition to the dissected leaf type is shown in older seedlings (Lincoln, Providence County, Rhode Island, *J. F. Collins* in 1929, *Mo 1291213*).

Significant specimens.—BRITISH COLUMBIA: Kelowna, *J. R. Anderson 1068, WSC;* Wardner, *Eastham* in 1943, *WSC.*

ALBERTA: Red Deer, *Gatz* in 1895, *Can.*

OREGON: (Except Columbia River.) BAKER CO. Powder River, *Cusick, UO.* KLAMATH CO. Klamath Lake, *Applegate 5413, DS, UC, Evans 293, UO.*

CALIFORNIA: HUMBOLDT CO. *Chestnut & Drew, HGr 5183;* Grouse Creek, *Chestnut & Drew* in 1888, *UC.* MENDOCINO CO. Howard Lake, Forest Reserve, *Eastwood 15267, CAS, UC, GH.* MODOC CO. Alkali Lake, *Manning 126* in 1903, *UC;* Jess Valley, *Eastwood & Howell 8080, CAS, Pom, DS, Peirson, L. S. Rose 40530* in 1940, *CH;* Camp Bidwell, *Matthews* in 1879, *NR.* PLUMAS CO. Indian Valley, *Austin* in 1878, *GH.*

NEVADA: Star Valley, *Greene* in 1896, *HGr.* ELKO CO. Lamoille Road over Humboldt River, *A. H. Holmgren 796, UC, WSC, Utah.*

UTAH: CACHE CO. Near Logan, *Piranian* in 1935, *Utah, WSC, Wash.* SALT LAKE CO. Poplar Grove, *Garrett 2679, NY, Clo.*

LOUISIANA: Richland, *R. S. Cocks* in 1910, *NY.*

VIRGINIA: North of Long Bridge, Chickahominy River, *Fernald & Long 11336, GH.* SUSSEX CO. Littleton, *Fernald & Long 12348, GH.* ISLE OF WIGHT CO. Southwest of Ivor, Blackwater River, *Fernald & Long 13612, GH.* SOUTHAMPTON CO. Meherrin River southeast of Branchville, *Fernald & Long 10259, GH.* PRINCESS ANNE CO. West of Neck Creek, *L. & F. Randolph 501* in 1922, *GH.*

Type collections.—(1) *R. multifidus*, "In Upper *Louisiana. . . . Bradbury. . . . v. s. in herb. Bradbury.*" (2) *R. fluviatilis*, "In a pond on Brighton road and elsewhere in deep water." "Within 5 or 10 mi. of Boston." 1812-3. *Bigelow.* (3) *R. flabellaris.* Nomen novum for *R. fluviatilis* Bigel. (4) *R. delphinifolius* none given. Northern and Middle States. (5) *R. lacustris*, "Very abundant in a small lake east of the village of Lansingburgh," Hudson River, cf. N. Y. Med. & Phy. Jour. 2: 112. 1823. (6) *R. missouriensis*, "A Missouri species, distributed by Mr. Bush." Apparently the type of this species was not noted by the writer at the Herbarium Grecneanum in the summer of 1935. The following may be the type: Fish Lake, Missouri, *B. F. Bush*, Aug. 15, 1886, *US 878* (labelled *R. missouriensis* by "C. L. P.") The plant is the palustrine form. (7) *F. submersus*, grown from seed "von Bingen im Staate Washington." (8) *F. terrestris*, grown from seed "von Bingen im Staate Washington." (9) *F. riparius.* Nomen novum for f. *terrestris* above, not *R. delphinifolius* f. *terrestris* (A. Gray) Blake, cf. *R. Gmelinii* var. *Hookeri.*

A curious form occurs in the vicinity of Leeds, Benson County, North Dakota. It has been named as follows: *R. Purshii* Richards var. *schizanthus* Lunell, Bull. Leeds Herb. (2): 6. 1908; *R. Purshii* var. *polymorphus* Lunell, *loc. cit.*; *R. Gmelinii* var. *schizanthus* L. Benson, Bull. Torrey Club 69: 315. 1942. Since none of the specimens have fruit, disposal of this plant under *R. Gmelinii* or *R. flabellaris* is not positive. However, the size of the submerged dissected leaves and the type of nectary scale indicate that the plant is a form of *R. flabellaris*, although the floating leaves resemble more those of *R. Gmelinii* var. *Hookeri*. A specimen from 8,000 feet elevation at Montrose, Colorado (Mrs. L. J. Brewster in 1892, *Ill*) has "*schizanthus*" type petals, and it appears to be *R. flabellaris*. It seems now to be most likely that the plants from North Dakota are forms of *R. flabellaris*, and tentatively this plant is referred there. It may be described as follows: Leaves all more or less deeply dissected, the aërial ones deeply 3-parted or -divided and again 2-3 times parted and cleft, about 3-3.5 cm. in diameter, the submersed ones finely dissected into linear ribbons 1-2 mm. broad, the blades 6-9 cm. in diameter; petals obdeltoid, 6-7 mm. long, 6-7 mm. broad, 2-3-lobed or -cleft, the nectary scales as in *R. flabellaris*. Sloughs and lake borders in the Prairies. Leeds and Lake Ibsen, Benson County, North Dakota. Known there only from the collections of Dr. J. Lunell. May and June. *Type collections:* (1) Var. *schizanthus*, "Leaves divided into three lobes, and the lobes finely dissected." No type collection given. The specimen in the Herbarium of the University of Minnesota, collected along sloughs at Leeds, North Dakota, June 1, 1903, *Lunell 448* has been designated as a lectotype, cf. L. Benson, *loc. cit.* Lectotype, *UM 257701* and *257702*; photograph *Pom-B*; isotypes, *NY* (*RM 46167* of the same date is var. *Hookeri*.) (2) Var. *polymorphus*, "The emersed leaves represent forms 1, 2, and 3 just described. The submersed leaves are capillary multifid [filiform dissected]. Stems elongated, sometimes several meters in length." No type collection given. The collection from the Peninsula of Lake Ibsen, North Dakota, May 23, 1908, *Lunell 447* has been designated as a lectotype, cf. L. Benson, *loc. cit.* Lectotype, *UM 257709*, *257710*, and *257711*, photograph *Pom-B*; isotypes, *Pom-B 268474*, *NY*, *RM 157087*, photograph *Pom-B*, *Ill*. The epithet *schizanthus* was applied to a palustrine form and the epithet *polymorphus* to an aquatic form. One plant of another collection at Leeds by *Lunell*, June 17, 190-?, has two notched petals, *RM 60825*.

Subgenus II CYRTORHYNCHA (Nutt.) A. Gray

Cyrtorhyncha, as genus, Nutt. in Torr. & Gray, Fl. N. Amer. 1: 26. 1838.
Cyrtorhyncha, as subgenus, A. Gray, Proc. Amer. Acad. 21: 366. 1886.

Glabrous terrestrial or palustrine perennials. Stems erect and branching, stoloniferous or scapose or each stem a caudex bearing basal leaves and scapes. Basal leaves simple and once or twice lobed, parted, or divided or ternately 2- or 3-times divided. Sepals 5, greenish-yellow and smaller than the petals or yellow or white and petaloid and larger than the petals, deciduous. Petals 5-16 or rarely 1 or none, yellow or greenish; nectary-scales various. Achenes 5-300, turgid or flattened, not constricted; the pericarp thin and usually fragile, with 3 or more branched or unbranched nerves on each face, glabrous; beak slender. Fruiting receptacle slightly or greatly enlarged, globose, pyriform or cylindroid.

Type species, *Crytorhyncha ranunculina* Nutt.

KEY TO THE SECTIONS

1. Petals larger than the sepals.
   2. Fruiting receptacle enlarged to several times its size in anthesis, cylindroid or long-ovoid; nectary scale overarching the nectary, truncate, the margins free

from the blade of the petal; stolons present; leaves simple .....Section. 1. *Halodes*.

2. Fruiting receptacle but slightly enlarged from its size in anthesis; nectary scale not overhanging the nectary, consisting of a mere transverse ridge below the gland; stolons not present; leaves compound .....Section. 2. *Eucyrtorhyncha*.

1. Petals smaller than the sepals; nectary scale forked, the lateral margins attached to the blade of the petal; stolons never present; receptacle but slightly enlarged in fruit, not cylindroid; leaves simple.

2. Sepals yellow; blades of the petals 7-8 mm. long, yellow .....Section. 3. *Arcteronthis*.

2. Sepals white; blades of the petals 1-3 mm. long, yellowish or greenish .....Section. 4. *Pseudaphanostemma*.

Section 1. HALODES (A. Gray) L. Benson

Halodes, as subgenus, A. Gray, Proc. Amer. Acad. 21: 366. 1886.
Halerpestes, as genus, Greene, Pittonia 4: 207. 1900.
Halodes, as section L. Benson Amer. Jour. Bot. 23: 174. 1936.

Glabrous or sparingly pilose palustrine perennials. Stems several, some simple or branched scapes and some stoloniferous. Basal leaf-blades shallowly crenately lobed. Cauline leaves few, reduced. Sepals not petaloid, smaller than the petals, greenish-yellow. Petals 5 or as many as 12, yellow, larger than the sepals, in each the blade conspicuous; the nectary scale overarching the nectary, truncate, the margins free from the blade of the petal. Achenes 25-300 in a cylindroid head, compressed; the pericarp marked on each face by branched nerves or about 4 striations. Fruiting receptacle much elongated, enlarged to several times its size in anthesis, cylindroid or long-ovoid.

Type species, *Ranunculus plantaginifolius* Murr.

79 RANUNCULUS CYMBALARIA Pursh.

Glabrous or sparingly hirsute palustrine perennials; roots about 1 mm. thick; scapes erect, 2-30 cm. long, branched or unbranched, stolons several dm. long, both about 1 mm. in diameter, not fistulous, basal leaf blades simple, cordate, ovate, reniform, trapezoidal, or rectangular, 5-22 mm. long, 2.5-20 mm. broad, crenate or sometimes merely 3-toothed or -lobed at the apices, proximally cordate, rounded to truncate and distally rounded or truncate, the petioles 2-5 cm. long, the stipular leaf bases 2-9 mm. long; pedicels mostly 1-3 cm. long in flower, mostly 2-6 cm. long in fruit, usually pubescent; sepals 5, greenish-yellow, spreading, elliptic, 2-5 mm. long, 1.5-3 mm. broad, glabrous, thick, the length of the petals, promptly deciduous; petals 5 or up to 12, yellow, obovate, 2-8 mm. long, about 2-3 mm. broad, the nectary scale overarching the nectary, truncate, the margins free from the blade of the petal; stamens usually 10-30; achenes 25-150 in a cylindroid head 3-8 or 13 mm. long and 3-5- or 6-mm. in diameter, each achene cuneate-oblong, about 1.5 mm. long, 0.8 mm. dorsoventrally, 0.3 mm. laterally, the pericarp thin, each face with about 4 striations or branched nerves, glabrous, the margin noticeable, the beak triangular, 0.3 mm. long, not curved; receptacle cylindroid, usually 2-3 mm. long in flower, 4-7 mm. long in fruit, hairy.

79a RANUNCULUS CYMBALARIA var. **typicus**, nom. nov.

R. Cymbalaria Pursh, Fl. Amer. Sept. 2: 392. 1814. *R. nanus* Fisch. in DC. Prodr. 1: 33. 1824, as syn. *R. Cymbalariae* var. *americanus* DC. *loc. cit. R. saxifragaefolius* Stephan. ex Steudl. Nof. ed. 2. 435. 1841, as syn. *Oxygraphis Cymbalaria* Prantl in Engl. Bot. Jahrb. 9: 263. 1888. *Cyrtorhyncha Cymbalaria* Britt. Mem. Torrey Club 5: 161. 1894. *Halerpestes Cymbalaria* Greene, Pittonia 4: 208. 1900. *R. Cymbalaria* f. *hebecaulis* Fern. Rhodora 16: 162. 1914.

Stems and petioles mostly 0.5 mm. in diameter; scapes 2.5 or 11 cm. long, usually branched; basal leaf blades cordate, ovate, or reniform, 5-22 mm. long, 4-20 mm. broad, crenate or sometimes merely 3-lobed at the apices in some of the leaves, *thin;* sepals and petals 3-5 mm. long; stamens usually 15-25; achenes usually 40-150 in a cylindroid head 3-8 or 13 mm. long and 3-4 or 6 mm. in diameter.

Mud especially of brackish streams and marshes. Himalaya Mountains and Siberia; Alaska and the Yukon to Labrador and Newfoundland and southward to northern Washington, (Puget Sound) Idaho, Utah, northeastern New Mexico (rare in the Western States), Texas (uncommon), Arkansas (rare), northern Illinois, and New Jersey; mostly coastal in New England. Late May to August.

The Old World forms are in need of further study in the light of their relationship to the New World types. Most, at least, of the Asiatic forms seen by the writer are either var. *alpina* or are intermediate between var. *typicus* and var. *alpina*. This is the probable reason for the distinction by Printz, Veg. Sib. Mong. Front. 236. 1921, of the American and Asiatic forms on the basis of leaf types (orbicular-reniform *vs.* quadrangular with a truncate base). Ultimate disposal of the Asiatic and South American types is postponed pending further investigation. Attention is called here to an article on nomenclature of certain members of this group by Nils Nylander, Bot. Notiser 1940(2): 193-199. 1940. This is summarized briefly by the writer, Biol. Atstr. 15(2): 2069 (entry 22412). 1941. Application of *R. Cymbalaria* to some Old World forms is open to question.

A collection from California may be var. *typicus*. It is as follows: MONO CO. East side of Sonora Pass, *Wiggins 9527, DS, Pom, Wash, GH.*

Significant specimens.—WASHINGTON: MASON CO. Mouth of Kennedy Creek, *C. N. Jones 3842, Wash.* SAN JUAN CO. Cattle Point, *Peck 12668, WillU, Wash, WSC.* WHATCOM CO. Bellingham, *Suksdorf* in 1890, *WSC.* ISLAND CO. Whidby ISLAND, *Gardner* in 1897, *Wash.* KING CO. Seattle, *Piper* in 1888, *Wash.*

IDAHO: Kelley's Hot Springs, *Mulford* in 1892, *NY, GH, Mo;* Clear Creek Valley, *Engelmann* in 1874, *Mo.* BOISE CO. Squaw Butte, *J. A. Clark 268, DS, GH.* OWYHEE CO. Silver City, *Macbride 347, RM, Ill, GH, Mo.* BLAINE CO. East Fork of Wood River, *Woods & Tidestrom 2793, US.* FREMONT CO. St. Anthony, *Merrill 431, US.*

UTAH: RICH CO. Bear Lake, *Maguire 172* in 1931, *Utah, W. C. & M. W. Muenscher 15919, WSC.* DAGGETT CO. Green Lake, *Hermann 4810, GH, WSC.* SAN PETE CO. Manti, *F. W. Hill* in 1909, *Ill.*

NEW MEXICO: *Palmer* in 1869, *GH.* Pecos River National Forest, *Standley 4149, US.* SANTA FE CO. Santa Fe, *Snow, US.* UNION CO. Cimarron River, *Waterfall 3179, GH.*

ARKANSAS: *Fremont Expedition to California* in 1845, *NY.*

Type collection.—(1) *R. cymbalaria*, "In saline marshes near the salt works of Onondago, New York." Topotype, *Aiken Herb., PA.* (2) *R. nanus*, none given; cited as syn. under *R. Cymbalariae.* (3) Var. *americanus*, same as *R. Cymbalaria*, based upon a reference to it. (4) *R. saxifragaefolius*, syn. for *R. Cymbalaria.* (5) *F. hebecaulis*, "ALBERTA: Banff, alt. 4,500 ft., June 11, 1906, *Butters & Rosendahl*, no. 1339 (TYPE in Gray Herb.)" Type, *GH*, photograph *Pom-B;* isotype *RM 107395*, photograph *Pom-B.* A pubescent form. A collection from East Green Lake, Uintah Mountains, Daggett Co., Utah (*F. J. Hermann 4810* [illegible]), ". . . was forma *hebecaulis Fernald*, (F. J. H. no. 4810), but plants grown from seed (Bot. Gard. no. 15157) are entirely glabrous." This is quoted from the garden specimen, *GH.*

79b RANUNCULUS CYMBALARIA var. ALPINA Hook. Fl. Bor. Amer. 1: 11. 1829

Stems and petioles mostly 0.5 mm. or less in diameter; scapes 2-7 cm. long, usually unbranched; basal leaf blades trapezoidal to rectangular or some of them almost cordate, 4-10 mm. long, 2.5-8 mm. broad, 3-toothed at the apices and normally not crenate, thin; sepals and petals 2-3 mm. long; stamens about 10; achenes 25-60 in a head 3-5 mm. long by 3-4 mm. in diameter.

Mud; Northern and Rocky Mountain Subalpine forests. Siberia and the Himalaya Mountains, Asia; far north from Alaska to west Greenland, Quebec, and Newfoundland. Specimens from Wyoming appear also to belong to this variety (Snake and Lower Hoback Rivers and Upper Hoback Basin at 6,500 to 7,500 feet) but this is very doubtful. Summer.

Numerous forms intermediate (with cordate, crenate leaves) between this variety (defined very strictly here) and var. *typicus* occur along the intermediate geographical areas and these are especially well-known from Quebec to Newfoundland and Nova Scotia. A similar type has been collected near Great Salt Pond, Rhode Island. Usually these intermediate types have been included with var. *alpina.* The status of the variety is not wholly beyond question, since leaves of the var. *alpina* type develop at the beginning of growth at each of the nodes of the stolons of the intermediate forms between var. *typicus* and var. *alpina.* The variety as interpreted strictly here may be tenable, but it is in need of much detailed study in the field and of further comparison for leaf types with seedlings and young plants developed at the nodes of the stolons of var. *typicus.* Transplant experiments would be significant, also.

Significant specimens.—WYOMING: TETON CO. Snake & Lower Hoback rivers, 6,500 ft., *Curtis* in 1900, *NY.* Upper Hoback Basin, 7,500 feet, *Curtis* in 1900, *NY.* (The latter collection possibly in Sublette Co.)

RHODE ISLAND: Great Salt Marsh Pond, *J. Spaulding* in 1916, *US* (intermediate form, apparently).

Type collection.—"Found by Mr. Drummond upon the Rocky Mountains."

79c RANUNCULUS CYMBALARIA var. SAXIMONTANUS Fern. Rhodora 16: 162. 1914 (Liberal policy: specific rank)

Ranunculus tridentatus H. B. K. var. *major* H. B. K. in DC. Syst. 1: 253. 1818, not *Ranunculus Cymbalaria* var. *major* Hook. & Thomson in 1855.

Stems and petioles mostly about 1 mm. in diameter; scapes 5-30 cm. long, usually branched; basal leaf blades cordate, ovate, or rarely reniform, 12-40 mm. long, 10-33 mm. broad, mostly crenate, thick; sepals and petals 4-8 mm.

long; stamens usually 20-35; achenes 100-300 in a head 5-12 mm. long and 3-5 mm. in diameter.

Mud of ocean inlets and of streams and marshes up to 7,500 feet elevation; primarily in the Sagebrush Desert and the Juniper-Pinyon Woodland. Vancouver Island, British Columbia, to Alberta, Manitoba (rare), Nebraska (Hay Springs), and Kansas (Logan County); southward through the Great Basin and the western edge of the Great Plains to Baja California and western Texas; on the Pacific Slope occurring only about Puget Sound (the prevailing variety), along the lower Columbia River, in the mountains of Kern County, California, and in Southern California; Mexico from northern Baja California, Chihuahua, and Coahuila, southward to Michoacán and Puebla; occurring in the Andes of South America. Late spring and summer.

Significant specimens.—SASKATCHEWAN: *Bourgeau* in 1857-8, *GH;* Moosejaw, *M. A. Barber 323, GH.*

MANITOBA: Brandon, *Macoun* in 1896, *Geol. Surv. Can. 12355, Can.*

OREGON: Portland, *Millard* in 1888, *NR.* The variety is common in Eastern Oregon, and it is not surprising that it should appear downstream on the lower Columbia River.

CALIFORNIA: Common in the areas indicated above "(east of Sierras; Southern California coast)," rare in the areas cited below: TUOLUMNE CO. Soda springs at Tuolume Meadows, west of the Sierra Nevada Crest, Yosemite National Park, *Sharsmith 434, UC, Pom-B;* along river near Pearson's Lodge, Yosemite National Park, *J. T. Howell 20196, CAS, Pom.* TULARE CO. Hockett Meadow, region of the Tulare-Little Kern Divide, *Dudley 1023, DS.* INYO CO. Death Valley Region (common northward). Panamint City, *J. T. Howell 4035, CAS. Gilman 2237, Pom;* Daylight Spring, Funeral Mts., *Gilman 2237, Pom.* LOS ANGELES CO. Mojave Desert collection. Lancaster, *Ferris 917, DS.* SAN BERNARDINO CO. Mojave Desert collections. Rabbit Springs, *Parish 9824, DS;* Mojave River at Victorville, *Parish 10524, DS:* Mojave River at Barstow, *Munz 2530, Pom, DS.*

ARIZONA: Northern and east-central Arizona. The two collections following from the edge of the Arizona Desert: MOJAVE OR YUMA CO. Bill Williams River at Planet Crossing, *Wiggins 8501A, DS.* YAVAPAI CO. Bradshaw Mountains, *Tuomey 36* in 1892, *DS, UA.*

NORTH DAKOTA: BENSON CO. Leeds, *Lunell* in 1904, *Ill, DS.* GRAND FORKS CO. Grand Forks, *Ueland 82* in 1900, *RM.*

SOUTH DAKOTA: Lake Hendricks, *W. Lawrence* in 1898, *NR.* CUSTER CO. Buffalo Gap, *McIntosh 118* in 1924, *RM.* FALL RIVER CO. Hot Springs, *Rydberg 493, US, NY.*

NEBRASKA: SHERIDAN CO. Hay Springs, *MacDougal 90, NY.* CHERRY CO. Merriman *Bales* in 1899, *RM.*

KANSAS: LOGAN CO. Springy soil, *Hitchcock 6* in 1895, *US, GH, NY, RM, Mo.*

OKLAHOMA: BEAVER CO. Near Beaver City, *Clifton 367, Ill, GH.* ELLIS CO. Shattuck, *Clifton* in 1914, *Ill, GH.* HARPER CO. Doby Springs, *G. Stevens 267, US, Ill, GH, 267, Ill, GH.*

MEXICO. STATE UNKNOWN: *Sessé, Mociño, Castillo, & Moldonado* in 1787, 1795, or 1804, *F; Berlandier* in 1827, *F, Mo, Berlandier 482, DS* (Harvey Herb.); *Hartweg 1, GH; Graham, GH.*

BAJA CALIFORNIA: Las Animas Canyon south of Ensenada, *Wiggins & Demaree 4702, DS, Pom-B, F, GH, Shr, Mich, UC;* San Jacinto Rancho 17 miles south of Santo Tomas, *Wiggins 4261, DS, Pom-B, Mich, UC, GH, US;* Sierra Juarez, *Gander 1776* in 1933, *SD;* Mission Santa Catarina, Sierra Juarez, *Wiggins 9133, US, DS:* Ensenada to Guadalupe, *Bailey 520* in 1936, *F;* Valle de la Trinidad, *Harbison* in 1936, *DS, SD.*

CHIHUAHUA: Camargo, *White 2259, US, GH, Shr.*

COAHUILA: San Juan de la Vaqueria, *Gregg 717* in 1847, *GH, Mo;* Saltillo, *Palmer 178* in 1898, *GH.*

SAN LUIS POTOSÍ: *Parry & Palmer 3* in 1878, *GH, PA, Mo.*

DURANGO: Durango, *Palmer 93* in 1896, *F, GH, Mo, UC.*

MICHOCÁN: Morelia, *Gregg 774* in 1849, *Mo.*

HIDALGO: Ixmiquilpan, *H. E. Moore, Jr. 3361, Pom.*

MEXICO: *Borgeau* in 1865-6, *GH;* Lake Xochimilcho, *Harshberger 79* in 1896, *PA, GH;* Lake Chalco, *Pringle 7402, GH;* San Juan Teotihuacán, *Langman 2047, PA.*

PUEBLA: Cepeara, Acatzinco Dist., *Arsène 2030, GH, Mo;* Lago Salido, *Weaver 866, Pom-B.*

R. tridentatus H. B. K. has been attributed by various authors to Mexico. Hemsley, Biol. Cent. 1: 9. 1879, cites three collections as follows: "South Mexico, ditches, Comancipilla (*Hartweg*), Mexico (*Graham, Berlandier 425*). HB. Kew." Duplicates of all these collections (see citation of significant specimens above) are *Cymbalaria* var. *saximontanus.*

Type collections.—(1) Var. *major,* "Juxta Carpio in Mexico." "Ad lacum S. Christobal, alt., 1180 hex." (2) Var. *saximontanus.* Nomen novum for *R. tridentatus* var. *major.*

Section 2 EUCYRTORHYNCHA L. Benson

Eucyrtorhyncha, as sect., L. Benson, Amer. Jour. Bot. 27: 805. 1940.

Glabrous terrestrial perennials. Stems erect and branching, never stoloniferous. Basal leaf-blades compound, ternately divided into 3 primary leaflets, which are normally again ternately lobed, parted, or divided. Cauline leaves usually well-developed and similar to the basal. Sepals deciduous, yellow tinged with green, only two-thirds the length of the petals but broader than the petals. Petals 5 or rarely 1 or none, yellow, in each the blade conspicuous, larger than the sepals; nectary-scale not overhanging the nectary, consisting of a mere transverse callus ridge below the gland. Achenes 5-15 in a capitate cluster; the thin pericarp marked on each face by 3-5 or 6 striations or branched nerves. Fruiting receptacle not enlarged, pyriform.

Type species, *Cyrtorhyncha ranunculina* Nutt.

80 RANUNCULUS RANUNCULINUS (Nutt.) Rydb.

Bot. Surv. Nebr. 3: 23. 1894

Cyrtorhyncha ranunculina Nutt. ex Torr. & Gray, Fl. N. Am. 1: 26: 1838. *R. Nuttallii* A. Gray, Proc. Acad. Phila. 15: 56. 1864. *C. neglecta* Greene, Pittonia 4: 146. 1900. *C. rupestris* Greene, Pl. Baker. 3: 3. 1901. *R. neglectus* L. C. Wheeler, Rhodora 39: 51. 1937.

Glabrous terrestrial perennials; roots about 1 mm. in diameter; stems erect, not rooting, 1-3 dm. long, 2-3.5 mm. in diameter, freely branching above, not markedly fistulous; basal leaf blades compound, ternately divided into 3 primary leaflets and these again nearly always ternately divided into secondary leaflets, which are ternately lobed, parted, or divided, the ultimate divisions tending to be lanceolate, narrowly elliptic, or ovate, and 2-3 or rarely 8 mm.

broad, more or less coriaceous, the petioles 5-13 cm. long, the stipular leaf bases 1-2 cm. long; cauline leaves alternate, similar to the basal or reduced, the upper sessile; pedicels 1-3 cm. long in flower, usually 2-6 cm. long in fruit, glabrous; sepals yellow tinged with green, spreading, narrowy elliptic, 3-6 mm. long, 1.2-2.2 mm. broad, glabrous, thin, two-thirds the length of the petals, promptly deciduous; petals 5, rarely 0 to 1, yellow, narrowly obovate, 5-7 mm. long, 1.5-2.5 mm. broad, the nectary scale glabrous, not overhanging the nectary, consisting of a mere transverse callus ridge below the gland; anthers elliptic; achenes 5-15 in a capitate cluster, each achene oblong, the shape sometimes distorted, 2.5-3.5 mm. long, 1.2-1.8 mm. dorsoventrally, about 1 mm. laterally, the thin pericarp marked on each face by 3-5 or 6 striations or branched nerves, glabrous, the margin obscure, the style persistent and flexible in fruit, the base stout, 1.5-2 mm. long; receptacle pyriform, 1 mm. long in flower, 1-1.5 mm. long in fruit, scaly, not hairy.

Mountainsides at 5,500 to 8,500 feet elevation; Rocky Mountain Montane Forest. Northern Utah (rare); southeastern Wyoming and southward through middle Colorado to northern New Mexico. Mostly May and June.

The apetalous form (*Cyrtorhyncha neglecta* Greene) occurring near Golden and Morrison, Colorado, is segregated poorly. It is inconsistent in presence or absence of petals, and, since there seems to be no other character to base the species upon, it is better neglected. Plants collected six miles southeast of Estes Park, Colorado, *L. Benson 4942, Pom-B,* show reduction of petal number or absence of petals apparently in anthesis. However, some of the "flowers" have one or two pistils developed into achenes, and it is possible that others may have only abortive or unfertilized pistils past anthesis. *Cyrtorhyncha neglecta* was not based upon similar material, for even the flower buds show no petals in those individuals among the specimens which have apetalous flowers. Specimens: Golden, *Greene* in 1870, *GH* (in part, flowering material has petals), in 1871, *NY, GH* (in part); Morrison, 6,000 ft., Bethel in 1899, *HGr* (lectotype, cf. below); Mt. Morrison, *Bethel & Clokey 1174, NY, CAS 4118* (*NY US, GH, CAS, Mo, DS, WSC, Utah* (petals well-developed in one plant), *RM* (3 sheets apetalous, other half and half), *Wash, Pom.*

Significant specimens.—UTAH: Granite Canyon, Uintah Mountains, *A. Krause* in 1881, *US 1391349* (type collection for a species by F. Kurtz to be named in the adjectival form of Krause's name but apparently not published). CACHE CO. Logan Canyon above "The Forks" (or North Fork on some labels), *C. P. Smith 1568,* May 10, 1909, *DS, Utah, Pom, RM;* Logan Canyon, north exposure, *Melvin Burke,* May 18, 1932, *Utah, UC, RM.*

NEW MEXICO: South of Tercio (Colorado Border), *A. & R. Nelson 4660, RM:* Pecos National Forest, *Burrall* in 1912, *US.* SANDOVAL CO. Pueblo Canyon near Los Alamos School, *Eggleston 20043, Pom-B, NY, GH, Mo.* COLFAX CO. Vermejo Park, *Mrs. D. St. John* in 1895, *GH, Robbins 560* in 1941, *Pom-B;* vicinity of Ute Park, *Standley 14536, NY, US.*

Type collections.—(1) *C. ranunculina,* "By the sides of gravelly brooks in the eastern Range of the Rocky Mountains, around the place known by the name of Independence Rock on the banks of the Sweet Water of the Platte, but not farther to the westward. Flowers in June." Wyoming. *Nuttall.* Isotypes, *NY, GH* (*Elias Durand Herb.*), photograph *Pom-B.* (2) *R. Nuttallii.* Nomen novum for *C. ranunculina.* (3) *C. neglecta,* "Occasional in dry ravines about Golden and Morrison, in middle Colorado, at about 6,000 feet altitude, flowering late in May. . . . I obtained it first in 1871.

in ravines about Golden City. . . . Last spring I requested Mr. E. Bethel of Denver to go in search of it . . . with the result that I soon had fine flowering specimens of my long neglected plant, and later, some thoroughly mature achenes." The writer did not note the presence of Greene's 1871 collection in the Herbarium Greenеanum in 1935. However it is represented in the New York Botanical Garden. The following specimen from Bethel's collection mentioned above has been designated as a lectotype, cf. L. Benson, Bull. Torrey Club 69: 377. 1942: Morrison, 6,000 feet, *E. Bethel*, May 27, 1899. Lectotype, *HGr 2267-8*, loose achenes of type, *Pom-B 268475*. (4) *C. rupestris*, "On moist cliffs in the Black Cañon [Gunnison Watershed in Colorado], 20 June, n 198," *C. F. Baker* in 1901. Type, *HGr 2269-70*.

Section 3 ARCTERANTHIS (Greene) L. Benson

Arcteranthis, as genus, Greene, Pittonia 3: 190. 1897.
Arcteranthis, as section, L. Benson, Amer. Jour. Bot. 23: 174. 1936.

Glabrous terrestrial perennials. Stem a caudex bearing basal leaves and simple scapes. Basal leaf-blades simple, reniform but appearing circular, divided and about twice-lobed. Cauline leaf scale-like. Sepals yellow, petaloid and twice as large as the petals. Petals 7-16, yellow; in each the blade conspicuous, 7-8 mm. long, the margins joining the edges of the forked nectary-scale. Achenes 25-30 in a convex cluster; the pericarp marked with 3 striations on each face. Fruiting receptacle but slightly enlarged, broad and convex.

Type species, *Ranunculus Cooleyae* Vasey and Rose.

81 RANUNCULUS COOLEYAE Vasey & Rose, Contr. U. S. Nat. Herb. 1: 289. *pl.* 22. 1893

Kumlienia Cooleyae Greene, Erythea 2: 193. 1894. *Arcteranthis Cooleyae* Greene, Pittonia 3: 190. *pl.* 3. 1897.

Glabrous terrestrial perennials; roots 1-1.5 mm. in diameter; caudex about 1 cm. long, scapes erect, 5-8 cm. long in anthesis, 2-3 dm. long in fruit, 1.5-2 mm. in diameter, unbranched; basal leaf blades simple, reniform, appearing circular, 1-2.5 cm. long, 2-4 cm. broad, 3-divided and then crenately-lobed, proximally cordate, distally rounded, the petioles 4-8 cm. long, the stipular leaf bases 1-2 cm. long; cauline leaf solitary or none, scale-like, sessile; pedicels 2-8 cm. long in flower, 3-20 cm. long in fruit; sepals yellow, spreading, narrowly elliptic or obovate, 7-9 mm. long, 5 mm. broad, glabrous, slightly exceeding the length of the petals and about 3 times their breadth, persistent after the corolla; petals 7-16 mm. long, 2-3 mm. broad, the nectary scale glabrous, forked, prolonged into the margins of the petal; stamens 50-70, the anthers elliptic, minute; achenes 25-30 in a convex cluster, each achene oblong, 2.5 mm. long, 1 mm. dorsoventrally, nearly 1 mm. laterally, the thin pericarp marked with 3 striations on each face, glabrous, the margins not prominent, the beak slender, about 1-1.3 mm. long, hooked at the tip; receptacle broad and convex, 1-2 mm. long in flower, 2-3 mm. long in fruit, glabrous.

Slopes near snow banks. Southern to southeastern coastal Alaska; mountains of western British Columbia; Colonel Bob Lookout, Olympic Mountains, Washington. June to August.

Significant specimens.—BRITISH COLUMBIA: Deboulés Mountain, Hazelton, *Macoun* in 1917, 3 collections, *Geol. Surv. Can. 94726, NY, GH, Can, 95727, NY, Can,*

95728, NY, GH, Can; mountain north of Bella Coola, *McCabe 1434, Wash;* Mt. Sir Sandford, *Butters & Holway 676, GH.*

WASHINGTON: GRAY'S HARBOR CO. Colonel Bob Lookout, Olympic Mountains, *J. W. Thompson 7236, Pom-B, Wash, UC, DS, GH, Mo, PA, 9978, DS, Wash, Mo, Pom.*

Type collection.—"Collected in fruit by Miss Grace Cooley, near the top of a snow-covered ridge, among loose rock, near Juneau, Alaska, August 6, 1891, and collected in flower by Mr. Frederick Funston, near the top of a bare mountain (1,000 meters high) of the St. Elias Alps, above Disenchantment Bay, Alaska, August 10, 1892." The *Cooley* specimen has been designated as a lectotype, cf. L. Benson, Amer. Jour. Bot. 23: 175. 1936; Bull. Torrey Club 69: 377. 1942. Lectotype, *US 15184;* isotype, *GH*, photograph *Pom-B.*

Section 4 PSEUDAPHANOSTEMMA (A. Gray) L. Benson

Pseudaphanostemma, as subgenus, A. Gray, Proc. Amer. Acad. 21: 365. 1886.
Kumlienia, as genus, Greene, Bull. Calif. Acad. 1: 337. 1886.
Pseudaphanostemma, as section, L. Benson, Amer. Jour. Bot. 23: 175. 1936.

Glabrous terrestrial perennials. Stem a caudex bearing basal leaves and simple or sometimes branched scapes. Basal leaf-blades semicircular or reniform, shallowly thrice-lobed. Cauline leaves wanting or one or two, if present, very small. Sepals white, petaloid, conspicuous and much larger than the petals. Petals 8-12, yellowish or greenish, reduced to stiped nectaries and almost lacking blades; the nectary-scale forked and the margins merging with the margins of the petal. Achenes 25-30 in a capitate cluster; the pericarp marked with 3 striations on each face. Seeds finely multistrate. Fruiting receptacle very slightly enlarged, ovoid.

Type species, *Ranunculus hystriculus* A. Gray.

82 RANUNCULUS HYSTRICULUS A. Gray, Proc. Amer. Acad. 7: 328. 1867

Kumlienia hystricula Greene, Bull. Calif. Acad. 1: 337. 1886.

Glabrous terrestrial perennials; roots a little fleshy, about 1.5 mm. in diameter; caudex less than 1 cm. long, scapes erect, 1.5-4 dm. long, 1 mm. in diameter, rarely once-branched, not fistulous; basal leaf blades simple, semicircular or reniform, 2-4 cm. long, 3-5 cm. broad, shallowly 3-lobed and the lobes again shallowly lobed, proximally cordate, distally rounded, the petioles 3-9 cm. long, the stipular leaf bases about 1 cm. long; cauline leaves none or one or two, if present, very small, sessile; sepals white and petaloid, conspicuous, spreading, narrowly obovate, 7-10 mm. long, 4-6 mm. broad, glabrous, much larger than and twice the length of the petals, deciduous; petals 8-12, yellowish or greenish, almost lacking blades, the claws 2-3 mm. long, the nectary scales glabrous, forked, the prolonged margins merging with the margins of the petal; achenes 25-30 in a capitate cluster, achene oblong, 2.7-3 mm. long, 1 mm. dorsoventrally, 0.6 mm. laterally, the pericarp with 3 striations on each face, glabrous, the margin not prominent, the beak slender, 1.3 mm. long, hooked at the tip; seeds finely multistriate; receptacle cylindroid, 1 mm. long in flower, 3 mm. long in fruit, glabrous.

Moist places near streams at 3,300 to 6,000 feet elevation; often about

waterfalls and notably so at Yosemite Valley; Sierran Montane Forest. Sierra Nevada from Butte County to Tulare County, California. May and June. Essentially the range of the Big Tree, *Sequoia gigantea*.

A collection at the Gray Herbarium (*Clara E. Cummings* in 1916) is labelled Portland, Oregon. Almost certainly this is an error.

Type collection.—"Foot-hills of the Sierra Nevada, at Forest Hill and at New Castle, Placer Co., April, 1865, Bolander. Also, 1866, by Mr. Rattan, a state with longer petioles (6 inches long), and scapes nearly a foot high: apparently wet soil." Lectotype, Dardennelles Canyon, near Butcher Ranch, *Bolander 4630*, *GH*, photograph (with cotype) *Pom-B;* isotypes, *US 320351*, *UC 9456*.

Subgenus III. CERATOCEPHALUS (Moench) L. Benson

Ceratocephalus, as genus, Moench, Meth. 218. 1794.

Ceratocephalus, as subgenus, L. Benson, Amer. Jour. Bot. 27: 806. 1940.

Terrestrial annuals. Hypocotyl (?) simulating a tap-root; stems scapose, simple, leafless. Basal leaves simple, 3-parted and again 2-3-parted into linear or broadly-linear parts. Sepals 5, green, not petaloid, smaller than the petals, persistent in fruit, but not marcescent. Petals 5, yellow; nectary-scale attached only at the base, elliptic. Achenes 30-50, the basal portion of each with a seed-chamber and two bulging empty lateral vescicles; pericarp firm and strong, smooth, tomentose; beak lanceolate. Fruiting receptacle slender, greatly elongated.

Type species, *Ceratocephalus spicatus* Moench.

The two species of this section, *R. testiculatus* Crantz and *R. falcatus* L., may be distinguished by the characters in the key below. Both species are native in southeastern Europe and Asia. *R. falcatus* has not been introduced into North America.

1. Fruit 5-6 mm. long, the empty vesicles not pointed, lying close together, with a narrow groove between them, the beak lanceolate-subulate, broadest near the base, straight to slightly curved; petals 3-5 mm. long ..... 83. *R. testiculatus*.

1. Fruit 9-10 mm. long, the empty vesicles with the apices angular to acutely pointed, lying well apart, with a broad groove between them, the beak falcate, broadest near the middle, strongly curved or recurved; petals 5-7 mm. long ..... *R. falcatus*.

83 RANUNCULUS TESTICULATUS Crantz, Stirp. Austr. ed. 1. fasc. 2. 97. 1763

Floccose terrestrial annuals; primary root below a well-developed slender taproot-like hypocotyl; stems scapose, erect or reclining, not rooting, 4-7 cm. long, about 1 mm. in diameter, unbranched and leafless, floccose; basal leaf blades simple, more or less reniform in outline, about 1 cm. long, 2 cm. broad, 3-parted and again 2-3-parted into broadly linear or linear parts, proximally cordate and each division distally acute, pilose-tomentose, the petioles 1-2 cm. long, pilose-tomentose, the blade attenuate into a broad wing along it; sepals green, spreading, narrowly elliptic-acute, 3-5 mm. long, 2-2.5 mm. broad, densely tomentose, three-fourth or four-fifths the length of the petals, persistent in fruit; petals 5, yellow, oblanceolate-spatulate, 3-5 mm. long, 2 mm. broad, the nectary scale glabrous, attached only at the base, elliptic;

stamens 10-20; achenes 30-50 in a subcylindroid head 13-18 mm. long, and 10-12 mm. in diameter, each achene with a turgid basal portion about 2 mm. long, this containing a seed chamber and 2 empty chambers, the beak lanceolate-subulate and about 4 mm. long, 1 mm. dorsoventrally, and 0.2-0.3 mm. laterally, smooth, tomentose, the margin prominent; receptacle slender, about 1 mm. long in flower, 5-9 mm. long in fruit, glabrous.

Introduced from the Old World and becoming common in the Intermountain Region from Eastern Washington and Eastern Oregon to Utah. Collected in Colorado in 1948. April and May.

Specimens examined.—WASHINGTON: Grand Coulee 8 miles north of the Dry Falls, *Rogers 287, WSC, Pom-B, Clo, WSC, CAS, Utah, GH, Mo,* 386, *WSC, Pom-B, Clo, CAS, GH, Mo.* Road connecting Columbia River with Hunters, Stevens County, *Rogers 403, WSC, Pom-B, Clo, CAS, Mo, Utah, GH.*

OREGON: GILLIAM CO. Congdon, *J. W. Thompson 11347, Wash, GH, Pom-B, Clo, CAS, UC, Mo, WSC.*

IDAHO: ADAMS CO. McCall, *Jeffrey* in 1946, *WSC.* BANNOCK CO. Southeast of Pocatello, *R. J. Davis 1892, ISB, Pom-B.*

NEVADA: ELKO CO. Boulder Creek, *Holmgren 853* in 1941, *Utah.*

UTAH: SALT LAKE CO. Mill Creek Canyon, Salt Lake City, *Garrett 6100, Gar, F* (acc. Field. Mus. Publ. Bot. 11: 155. 1936), *Pom-B, 6872, Gar, Pom-B;* Salt Lake City, *Garrett* in 1932, *RM, 8497a, Clo.* MILLARD CO. Fillmore, *Maguire 20469* in 1941, *CAS, Utah.* SAN PETE CO. Ephraim, *Maguire 19983* in 1940 *Utah, Nielsen* in 1940, *Utah.*

COLORADO: MESA CO. Colorado National Monument, *Weber 3771, Pom.*

Type collection.—Old World.

Subgenus IV OXYGRAPHIS (Bunge) L. Benson

Oxygraphis, as genus, Bunge, Verz. Suppl. Fl. Alt. 46. 1836.

Euoxygraphis, as subgenus of *Oxygraphis,* Freyn, Flora 70: 140. 1887.

Oxygraphis, as subgenus of *Ranunculus,* L. Benson, Amer. Jour. Bot. 27: 806. 1940.

Glabrous terrestrial perennials. Stem a caudex bearing basal leaves and simple, leafless scapes. Leaves all basal, simple, slightly lobed at the apices or subentire, thick. Sepals 5, green tinged with red or purple, not petaloid, shorter and broader than the petals, persistent in fruit but not marscent. Petals 7 or more, yellow (?); the nectary scale a transverse ridge, not overhanging the nectary (or perhaps the nectary extending in a deep, narrow pocket under the scale). Fruits about 20, flattened, utricular, prismatic, not constricted, the pericarp firm and close-fitting, having one thickened longitudinal angle or ridge on each of the two faces, glabrous; beak slender. Fruiting receptacle not much enlarged.

Type species, *Oxygraphis glacialis* Bunge.

84 RANUNCULUS KAMCHATICUS DC. Syst. 1: 302. 1818

Ficaria glacialis Fisch, ex DC. Syst. 1: 305. 1818, not *Ranunculus glacialis* L. in 1753. *Oxygraphis glacialis* Bunge, Mem. Acad. Imp. Sci. St. Petersb. 2: 557. 1835; Verz. Suppl. Fl. Alt. 35 (in reprint at Gray Herbarium). 1836. *R. camtschaticus* Steudl. Nom. ed. 2. 2: 432. 1841. *R. kamtschaticus* Ledeb. Fl. Ross. 1: 47. 1842, as syn.

Glabrous terrestrial perennials; roots slender; caudex 1 cm. long; scapes erect, 2-6 or 10 cm. long, 1-1.5 mm. in diameter, unbranched, not fistulous; basal leaf blades simple, orbicular-elliptic, ovate, or oblong, 8-22 mm. long, 5-22 mm. broad, slightly lobed at the apices or subentire, proximally truncate or tapering, distally rounded, the petioles about 1 cm. long; cauline leaves none; sepals greenish, tinged with red or purple, spreading, elliptic or oblong, 4-10 mm. long, 3-6 mm. broad, glabrous, thick, about the length of the petals, persistent in fruit, but not withering; petals 7-16, yellow, oblanceolate, 5-15 mm. long, 1.5-4 mm. broad, the nectary scale glabrous, a transverse ridge basal to the gland; utricular fruits tinged with purple, about 20 in a hemispheroid head 5 mm. in diameter, prismatic or flattened, 1.5-2 mm. long, 1-2 mm. dorsoventrally, about 0.8 laterally, smooth, with a thickened angle or rarely 2 nerves on each face midway between the dorsal and ventral sutures, the margin not very prominent, the beak 0.7-2 mm. long, straight. more or less subulate; receptacle 1 mm. long in flower, 1-2 mm. long in fruit, broad.

Wet ground near sea level and at high elevations in the mountains; Arctic Grassland and Tundra. Boreal regions and high mountains of Asia; Aleutian Islands, Shumigan Islands, and the Seward Peninsula, Alaska. Summer.

Specimens examined.—ALASKA: Popoff Island, Shumigan Islands, *Kincaid* in 1899, *US;* Teller Reindeer Station, *Walpole 1479, US, 1874, US.* Hultén, cites under *Oxygraphis glacialis*), Fl. Aleut. I. 182. 1937, the following specimens from the Aleutian Islands: Carlisle Island, *Hultén 6576;* Atka, *Eyerdam 1013,* Hultén *6552:* Rat Island, *Hultén 5990.* The plant is reported to be high alpine in the Aleutians.

Type collections.—(1) *R. kamchaticus,* "Hab. in Kamchatka. *h. Pall.* . . . (Vs. sp. in h. Pall., nunc. Lam.)" (2) *F. glacialis,* "Hab. in Daouria ad apicem montis Tchokondo. *Pansner.*" It is to be noted that Ledebour, *loc. cit.* chose *glacialis* in preference to *kamchaticus,* which was published simultaneously.

Subgenus V. CRYMODES A. Gray

Crymodes, as subgenus, A. Gray, Proc. Amer. Acad. 21: 365. 1886.
Crymodes, as subgenus of *Oxygraphis,* Freyn, Flora 70: 140. 1887.
Beckwithia, as genus, Jepson, Erythea 6: 96. 1898.

Glabrous terrestrial perennials. Stem a caudex bearing leafy or scapose flowering branches. Basal leaves compound, reniform or cordate in outline, triternately 2-4-times-divided or -lobed. Sepals 5, red, petaloid, smaller than the petals, marscent-persistent in fruit, thin. Petals 5, red, or reported as sometimes white; the nectary covered by a thick, very short scale the margins of which are produced into ridges on the petal-surface, these extensions ending in flap-like structures. Fruits 15-25, flattened, not constricted, utricular, thin, smooth, or partly reticulate, glabrous; beak slender or reduced. Fruiting receptacle not greatly enlarged.

Type species, *Ranunculus glacialis* L.

The supposed very close relationship of this subgenus to the subgenus *Oxygraphis* is erroneous. The supposition was based upon overemphasis of one of the characters in common (persistent sepals) and upon ignoring of the numerous differences. Division of the genus would not permit inclusion of *Crymodes* under *Oxygraphis,* since it is no more closely related to that sub-

genus than to several others. Any segregation of this group of species should involve careful analysis of the characters of *R. juniperinus*, since it is the least specialized of those represented here.

1. Sepals densely reddish-brown pilose or hirsute; beak of the fruit 2-3 mm. long; flowering stems with 2 or more leaves; apical portion of the pericarp somewhat to markedly reticulate; boreal and alpine. (The *Ranunculus glacialis* group.) ..... 85. *R. glacialis.*

1. Sepals glabrous; beak of the fruit 0.5 mm. long; stems with not more than one small leaf; pericarp undifferentiated; deserts or low mountains. (The *Ranunculus Andersonii* group.)

2. Fruits 4-6 mm. long; scapes with usually 1 bract and one or two flowers ..... 86. *R. juniperinus.*

2. Fruits 9-14 mm. long; scapes practically always with no bracts and with one flower ..... 87. *R. Andersonii.*

85 RANUNCULUS GLACIALIS L.

Glabrous or reddish-brown hispid terrestrial perennials; caudex 2-5 cm. long, stout; flowering stems erect or suberect, not rooting, 1-3 dm. long, 1.5-3 mm. in diameter, branching or unbranched; basal leaf blades compound with the primary leaflets again divided, the ultimate segments 2-5 mm. broad, tending to be lanceolate or ovate, the petioles 1-6 cm. long; cauline leaves commonly 2-3, alternate, similar to the basal but the upper reduced; pedicels 1.7-3.5 cm. long in flower, longer in fruit; sepals reddish, spreading, ovate-acute, 10-13 mm. long, 5-8 mm. broad, densely reddish-brown pilose dorsally, nearly the length of the petals, marcesent-persistent in fruit; petals 5, red or reported to be sometimes white, cuneate, 10-15 mm. long, 8-15 mm. broad, the nectary scale glabrous, very short, thick, the margins produced into flap-like ridges on the petal blade and these sometimes free at the tips; stamens numerous; fruits 30-40 in a hemispheroid cluster, each fruit stomach-shaped, 2-3 mm. long, 1.5-2 mm. dorsoventrally, 0.6-1 mm. laterally, the pericarp basally indurated around the seed and apically and marginally slightly to markedly reticulate and sacrious, glabrous, the margin not prominent, the beak 2-3 mm. long, the seed cylindroid, 1.5-1.8 mm. long, 1 mm. in diameter; receptacle subglobose or pyriform, 1-2 mm. long in flower, not much enlarged in fruit, glabrous.

85a RANUNCULUS GLACIALIS var. GENUINUS L.

R. glacialis L. Sp. Pl. 553. 1753, not *Ficaria glacialis* Fisch. ex *DC. in* 1818 (*Oxygraphis glacialis* Bunge in 1835). *Oxygraphis vulgaris* Freyn, Flora 70: 141. 1887.

Glabrous or subglabrous, the relatively few hairs not straight and arising singly; stems with 1-3 flowers; basal leaves usually compound, reniform in outline, 1.5-3 cm. long, 3-6 cm. broad, triternately divided into primary leaflets, which are agains divided, the ultimate segments 2-5 mm. broad, tending to be lanceolate or ovate; cauline leaves glabrous; achenes about 3 mm. long, the pericarp indurate basally and apically and marginally reticulate and scarious between the reticulations, the beaks about 2 mm. long.

Wet ground, often near snow ". . . wet, gravelly snow-patches at water-

streams originating from the melting snow" (Sørenson, Meddel, Grønl. 101 (3): 54. 1933); Arctic Grassland and Tundra. East Greenland and Iceland to northern Europe and the Alps. Summer.

Type collection.—"*Habitat in Alpinus* Lapponiae, Helvetiae." *O. vulgaris* Bunge was a nomen novum for *R. glacialis* L.

85b **Ranunculus glacialis** var. **Camissonis** (Schlect.) L. Benson, comb. nov.
(Liberal or perhaps moderate policy: *R. Camissonis* Schlect.)

R. Camissonis Schlect. Animad. Ranunc. 1: 12. 1820. *R. chamissoi* Spreng. Syst. 2: 650. 1825. *R. Chamissonis* Ledeb. Fl. Foss. 1: 31. 1842. *R. glacialis* subsp.*Chamissonis* Hultén, Fl. Alaska & Yukon, Lunds Univ Arssk. II. 40(1): 753. *f. 3.* 1944.

Hispid-hirsute on the upper parts with matted, reddish-brown, straight hairs about 1.2-2 mm. long, these produced in tufts on papillae; basal leaves simple, reniform in outline, 1-2 cm. long, 2-3 cm. broad, divided into 3 segments, these again 3-5-lobed or -cleft, the lobes obtuse or rounded, glabrous; cauline leaves hirsute; achenes about 2 mm. long, in the specimens available only slightly reticulate-roughened, the beaks 2.5-3 cm. long. (Since only a few specimens have been available, some of the quantitative characters may not be representative of true differences from var. *genuinus*, but may characterize only the specimens examined.)

Wet places; Arctic Grassland and Tundra. Siberia; Alaska, on or near Bering Strait. August.

Specimens examined.—ALASKA: Little Diomede Island, 65° 46′ N, 168° 55′ W, *A. E. & R. T. Porsild 1693, GH, Can;* Gambell, St. Lawrence Island, *J. P. Anderson 3701, ISC;* Wales, Cape Prince of Wales, *J. P. Anderson 4946, ISC,* ...., *US 423139.*

Type collection.—"Habitat ad pedem montium glacialium loca uda glacie deliquescente madida in sinu St. Laurentii, qui in littore Asiae arcticae orientalis, haud procul a freto Bahringii meridiem versus est situs, unde magnam hujus plantae copiam allulit amicissimus de Chamisso in cujus honorem hanc pulchram dixi speciem." The epithets by Sprengel and Ledebour are mere variants in spelling.

86 RANUNCULUS JUNIPERINUS M. E. Jones,
Proc. Calif. Acad. II. 5: 616. 1896

R. Andersonii A. Gray var. *tenellus* S. Wats. in King, Rept. Geol. Surv. 40th. Par. 5: 7. 1871, not *R. tenellus* Nutt in 1838. *Beckwithia juniperina* Heller, Muhlenbergia 1: 144. 1906.

Glabrous terrestrial perennials; roots slender, about 1.2 mm. in diameter; caudex 3-5 cm. long, stout; scapes erect, 23-33 cm. long, 2-2.5 mm. in diameter, simple or 2-flowered, not fistulous; basal leaf blades compound, reniform in outline, 2-2.5 cm. long, 3-5 cm. broad, triternately 2-3 times divided, the ultimate segments 1-1.5 mm. broad, linear, sharply acute, the petioles 3-6 cm. long, the stipular leaf bases 2-3 cm. long; cauline leaf 1, scale-like, sessile; pedicel and scape practically continuous; sepals reddish, spreading, broadly elliptic to nearly round, 6-9 mm. long, 5-8 mm. broad, glabrous, about half the length of the petals, marcesent-persistent in fruit; petals 5, red, round or sometimes broader than long, 12-15 mm. long, 12-15 mm. broad, the nectary

scale glabrous, thick, very short, the margins extended and attached or the tips free; stamens possibly 35-50; fruits 25-35 in a hemispheroid cluster, each fruit obovate, 4-6 mm. long, 3-4 mm. dorsoventrally, 0.5 mm. laterally, smooth, glabrous, the margin not prominent, the achene beak thin and flat, 0.5 mm. long, straight; receptacle subglobose or pyriform, 1-2 mm. long in flower, not much enlarged in fruit.

Rocky slopes at 5,000 to 6,500 feet elevation; Juniper-Pinyon Woodland. Karshaw, Meadow Valley Wash, eastern Nevada; Utah; Virgin Mountains, northwestern corner of Arizona.

This is the least specialized of the North American species in this subgenus at least in so far as the type of fruit is concerned, and it and *R. glacialis* and its var. *Camissonis* rather than merely *R. Andersonii* should be studied with care by authors who consider recognition of *Beckwithia* as a genus.

Specimens examined.—NEVADA: Gold Mountain, 5-6,000 feet, *Purpus 5991, UC.* LINCOLN CO. Karshaw (Kershaw), Meadow Valley Wash, *Goodding 630* in 1902, *Pom, NY, HGr, GH, UC, RM, US, Mo.*

UTAH: Fish Springs Mountains, *M. E. Jones* in 1904, *Pom, US, UC, Mo;* Detroit, *M. E. Jones* in 1891, *Pom, US, UC, Mo.* TOELE CO. Dutch Mountains, *M. E. Jones* in 1900, *Pom, NR.* SALT LAKE CO. Pilot Rock Point, Salt Lake Valley, *S. Watson 17* in 1869, *GH, US* (type and isotype of var. *tenellus*, cf. below.) MILLARD CO. White Sage Valley, 50 miles west of Hinckley, *Harrison 6342, Utah, RM;* Antelope Springs 40 miles west of Hinckley, 6,500 feet, *Harrison 6315, UC.* WASHINGTON CO. Pine Valley Mountains, *Johnson* in 1873, *GH;* Apex Mine, *Cottam 4726, Utah;* Santa Clara Valley, *M. E. Jones 5139x, Pom, US* (cotype and duplicate of *R. juniperus*, cf. below); 18 miles west of St. George, *M. E. Jones* in 1894, *NY, US;* Pinyon belt between St. George and Beaverdam Mountains, *Tidestrom 9360, US;* Beaverdam Mountains, *Parry* in 1874, *Mo. PA* (loc. not given in any but the *Mo* collection), *NY, HGr, GH, UC, RM, US;* Top of Zion Canyon, *L. Cooper* April 28, *Pom;* 3 miles east of Tunnel, Zion National Park, *C. L. Hitchcock 2973, Pom, WSC.* GARFIELD CO. *Siler* in 1883, *PA.*

ARIZONA: MOHAVE CO. Virgin Mountains, *Goodding 2135, GH, UC, RM, Mo.*

Type collections.—(1) Var. *tenellus*, "Pilot Rock Point, Salt Lake, Utah. (17.)" *Sereno Watson*, June 17, 1869, 5,000 feet altitude. Type, *GH*, isotype, *US* (Salt Lake Valley). (2) *R. juniperinus*, "No. 5011 April 4, at Copper Mine, 18 miles west of St. George, Utah, in Beaverdam Mts., 5000° alt., among junipers in loose gravelly soil. No. 5139, April 30, at head of the west branch of Santa Clara Valley in the Beaverdam Mts., Utah, 5000° alt., in loose soil on rocks, among junipers." *Jones 5011* has been designated as a lectotype, cf. L. Benson, Bull. Torrey Club 69: 379. 1942. Lectotype, *Pom 99459;* isotypes, *UC 157615, Mo* (not numbered); cotype (*M. E. Jones 5139x*), *Pom 99456, US.* The following specimens are either isotypes or cotypes, *US 365874* and *365873.*

87 RANUNCULUS ANDERSONII A. Gray, Proc. Amer. Acad. 7: 327. 1867

Oxygraphis Andersonii Freyn, Flora 70: 140. 1887. *Beckwithia Austinae* Jepson, Erythea 6: 97. *pl.* 1. 1898. *B. Andersonii* Jepson, Erythea 6: 99. 1898.

Glabrous terrestrial perennials; roots about 1 mm. in diameter; caudex 3-5 cm. long, stout; scapes erect, not rooting, 1-2 dm. long, 2 mm. in diameter, 1- or rarely 2-flowered, not fistulous; basal leaf blades compound, cordate or reniform in outline, 1-3 cm. long, 2-4 cm. broad, pinnate, the 3 leaflets dissected into ovate, lanceolate, or linear segments 7-8 mm. long, 1-3 mm. broad, obtuse or acute, the petioles 3-6 cm. long, the stipular leaf bases 2-3 cm. long; cauline

leaves none or rarely 1, then scale-like and sessile; sepals reddish, very thin, spreading, broadly elliptic to nearly circular, 7-8 mm. long, 5-7 mm. broad, glabrous, half the length of the petals, marcesent-persistent in fruit; petals 5, red, cuneate to round, 15-19 mm. long, 10-15 mm. broad, the nectary scale glabrous, thick, very short, the margins extended and attached to the petal or the tips free; stamens 75-100; fruits 15-25 in a globose cluster, each fruit obovate, 9-14 mm. long, 7-9 mm. dorsoventrally, 0.6 mm. laterally, smooth, glabrous, the margin not prominent, the beak 0.5 mm. long; seed 4-5 mm. long by 1 mm. in diameter, receptacle depressed-subglobose, 1 mm. long in flower, 1-2 mm. long in fruit, pubescent.

Rocky mountainsides at 3,000 to 7,500 feet elevation; Juniper-Pinyon Woodland and Sagebrush Desert. Southeastern Oregon to central and southern Idaho, and southward east of the Sierra Nevada to the Panamint and Grapevine Mountains, California, and to northern Nye County, Nevada.

Specimens examined.—OREGON: Eastern Oregon, *Cusick 1828* in 1898, *UO*. LAKE CO. Bullard Canyon, Lakeview, *Eggleston 6925, US;* south of Bull's Prairie, *Loveless 147, UO* (possibly *US*). MALHEUR CO. Stony Hills, *Cusick* in 1901, *DS;* Juniper Mountain, *Cusick 2371, Pom, GH, US, HGr, UC, RM, Mo, PA*.

CALIFORNIA: Sierra Nevada, *Lemmon* in 1875, *US*, in 1895, *Mo*. MODOC CO. High Mountains, Goose Lake, *Bruce* in 1899, *DS;* Lake City Mountain, *Austin & Bruce 2134, UC, Pom* (type and isotype of *Beckwithia Austinae*, cf. below); Jess Valley, *L. S. Smith 795½, J*. LASSEN CO. Diamond Mountain south of Susanville, 7,000 to 7,500 feet elevation, *Stebbins & Jenkins 2270, UC*. PLUMAS CO. East side of Beckwith Peak, Sierra Valley, 5,500 to 6,000 feet, *Stebbins & Jenkins 2147, UC, DS*. PLUMAS OR SIERRA CO. Sierra Valley, *Lemmon* in 1875, *UC*, in 1879, *GH*, Mo, in 1893, *GH*. INYO CO. Foothills west of Bishop, *Heller 8316, US, GH, CAS, DS, Mo, PA, Pom, M. E. Jones* in 1927, *Pom;* 2 miles south of South Fork of Oak Creek, open country, *Kern* in 1940, *CAS;* Pleasant Canyon, Panamint Mountains, *M. E. Jones* in 1897, *Pom, US, GH;* Skidoo to Ballarat, Panamint Mountains, *Monnet* in 1914, *CAS;* Grapevine Mountains, Death Valley, *Gilman 2537, Pom*.

IDAHO: Mountains bordering the Snake River Valley from Ada County to Blaine and Bannock counties. "Idaho," *Oyster* in 1887, *GH*. ADA CO. Boise, *Wilcox* in 1891, *GH*. ELMORE CO. Dog Mountain north of Pine, *Hitchcock & Muhlick 8736, RM, GH, Wash, WSC*. CAMAS CO. Crouch Summit north of Soldier, *Hitchcock & Muhlick 8758, RM, GH, WSC, Wash;* Sawtooth National Forest, probably Camas Co., *C. N. Woods* in 1910, *RM*. BLAINE CO. Galena Summit, *R. J. Davis 3076, ISB, Wood* in 1941, *Clo*, mountain near Ketchum, *Mulford* in 1892, *NY, Mo*, Ketchum, *Brodhead, Pom;* Alturas Lake, *Cronquist 14* in 1936, *Utah*. POWER CO. Bannock Peak, *R. J. Davis 155* in 1938, *ISB*. BINGHAM CO. East Butte, Twin Buttes, *R. J. Davis* in 1943. BANNOCK CO. Pocatello, *Soth P229* in 1922, *RM, R. J. Davis* in 1925, *ISB*, Mink Creek, Pocatello, *R. J. Davis* in 1935, *WSC, ISB;* City Creek, *R. J. Davis* in 1935, *RM;* Gibson Jack-City Creek Divide, *Cronquist 14* in 1936, *Utah*.

NEVADA: Trinity Mountains, *S. Watson 16* in 1868, *NY, US;* Aurum, *M. E. Jones* in 1893 (3 collections) *NY, Pom, US, GH, CAS, DS, RM, Mo, PA;* head of Ruse River, *V. Bailey 104, US*. WASHOE CO. Hunter Creek Canyon, west of Reno, *Kennedy 866* in 1904, *RM, Kennedy & True 712* in 1903, *RM;* Fish (Mor rills) Lake above Marmol Station, *Heller 10002* in 1910, *NY, US, CAS, DS, Mo, PA;* Reno, *Hillman* in 1897, *Pom, UC*. ORMSBY CO. Blind Springs Mountain, near Carson City, *C. L. Anderson* in 1866, *GH, US, UC* (type and isotypes, cf. below). STOREY CO. Virginia City, *Mathis 1256*, C. ELKO CO. *Hirst 119* in 1938, *Utah;* South of Railroad Canyon, *A. H. Holmgren 803, UC, Utah;* Spruce Mountain, *Holmgren 1193, Utah;* White Horse Pass, *Lund, Holmgren, & Cooper 57* in 1939, *Utah*. NYE CO. Mohawk Canyon, Toiyabe Range, *Maguire & Holmgren 25421* in 1945, *Pom*.

Currant, *Bentley* in 1916, *DS, Pom, US;* Currant Creek above Currant, *Ripley & Barneby 3549, CAS.*

Type collections.—(1) *R. Andersonii*, "Near snow, on Blind Springs Mountain in the Eastern Sierra Nevada, Dr. C. L. Andersen, 1866." The specimen in the Gray Herbarium was collected near Carson City, Nevada, by Andersen in 1866. Type, *GH*, photograph *Pom-B;* isotypes *US 344245, UC 170274* (probable isotype). (2) *B. Austinae*, "Decomposed lava on the western treeless slope of Lake City Pass, Modoc County, California, June 1898." *Austin & Bruce 2134.* Type, *UC 9021;* isotype, *Pom 99452.*

Subgenus VI BATRACHIUM (DC) A. Gray

Batrachium, as section, DC. Syst. 1: 232-3. 1818.
Batrachium, as genus, S. F. Gray, Nat. Arr. Brit. Pl. 2: 720. 1821.
Batrachium, as subgenus, A. Gray, Proc. Am. Acad. 21: 363. 1886.

Glabrous aquatic annuals or perennials. Stems branching. Leaves mostly cauline, submerged and finely dissected into capillary divisions or floating and merely lobed or parted. Sepals 5, light green, not petaloid, smaller than the petals, deciduous. Petals 5, not glossy,white or sometimes yellow at the bases; in each the nectary-scale forming, a minute pocket or a ridge below the gland, or obsolete. Achenes 4-30, turgid, not constricted; pericarp thick and close-fitting, roughly transversely-ridged, glabrous or hairy; beak slender, sometimes deciduous. Receptacle in some species somewhat enlarged in fruit, pyriform.

Type species, *Ranunculus hederaceus* L.

KEY TO THE SPECIES

1. Receptacle glabrous.
   2. Plant with some non-dissecting floating leaves; achenes 4-15 .(The *Ranunculus hederaceus* group.)
      3. Style in anthesis half as long as the ovary; leaves all shallowly-lobed, none finely-dissected; achenes 7-15 .....88. *R. hederaceus.*
      3. Style in anthesis 2-3 times as long as the ovary; leaves dimorphous, the upper ones floating and deeply 3-parted, the lower ones submersed and dissected into filiform divisions; achenes 4-6 .....89. *R. Lobbii.*
   2. Plant with no non-dissected floating leaves .....90. *R. aquatilis* var.
1. Receptacle hispid; style in anthesis not longer than the ovary. (The *Ranunculus aquatilis* group.)
   2. Style largely deciduous after flowering, the achene beak 0.3 or rarely 0.5 mm. long; body of the achene obovoid, 1-1.5 mm. long (rarely 2-2.5 mm. long in a variety from Oregon and Northern California), finely transversely wrinkled.
      3. Pedicels not recurved at fruiting time; submersed dissected leaves (sometimes the only kind), usually petioled, the first divisions arising usually, but not always, well above the non-dilated stipular leaf-bases (the ends of these not free), usually collapsing when withdrawn from the water, not circinate, in the North American varieties usually about equalling or a little shorter than the internodes; achenes usually about 10-20 or up to 40; dissected leaves usually repeatedly trichotomous .....90. *R. aquatilis.*
      3. Pedicels recurved at the bases at fruiting time; submersed dissected leaves (the only kind) usually sessile, the first divisions arising within the usually dilated stipular leaf-bases (the ends of these often free), usually not collapsing when withdrawn from the water, circinate, much shorter than the internodes; achenes mostly 30-45 or 80; dissected leaves usually once or twice trichotomous .....91. *R. circinatus.*
   2. Style persistent after flowering, the achene beak 0.7-1.1 mm. long; dissected leaves once or sometimes twice trichotomous, then dichotomous.

3. Achene body 1-1.5 mm. long, the transverse ridges relatively small; achenes about 7 or commonly 15-25 ..... 92. *R. longirostris.*

3. Achene body 2.3-3 mm. long, the transverse ridges relatively large; achenes about 10 ..... 93. *R. pueblensis.*

88 RANUNCULUS HEDERACEUS L. Sp. Pl. 556. 1753

Batrachium hederaceum S. F. Gray, Nat. Arr. Brit. Pl. 2: 271. 1821.

Glabrous aquatic "perennials"; roots slender; stem floating, rooting at the lower nodes, 0.5-3 dm. long or longer and about 1.5-3 mm. in diameter, branching, with large air chambers in the cortex, the vascular tissue far toward the center; leaf blades simple, all alike, floating, essentially reniform, 5-7 mm. long, 10-13 mm. broad, shallowly and angularly 3-lobed, the lateral lobes again shallowly notched, proximally cordate or nearly truncate and distally rounded, the petioles 1-3 cm. long, the stipular leaf bases 3-5 mm. long, the cauline leaves alternate, petioled; pedicels 0.5-2 cm. long in flower, 1-3 cm. long in fruit, glabrous; sepals 5, light green, spreading, ovate, 1.5-2 mm. long, 1-1.5 mm. broad, glabrous, two-thirds the length of the petals, promptly deciduous; petals 5, white, obovate, 1.5-2.5 mm. long, 1 mm. broad, the nectary scale a mere lunate ridge below the gland; stamens 5-10; achenes 7-15 in a globose cluster, each achene obovoid, 1 or up to 1.5 mm. long, 0.7-0.9 mm. dorsoventrally, 0.7 mm. laterally, roughly transversely ridged, glabrous, the margin rather prominent, the style in anthesis 0.5 mm. long, deciduous, the achene beak 0.1 mm. long; receptacle about 1 mm. long in flower, 1-1.5 mm. long in fruit, glabrous.

Aquatic in fresh water at low elevations. Northern and Deciduous forests. Europe; probably native in Newfoundland and along the coastal plain in Chester County, Pennsylvania; along Chesapeake Bay; southward from Prince George County, Maryland, to Princess Anne County, Virginia; and at Charleston, South Carolina. Late April to early summer.

This species and *R. Flammula* are members of a group of western European species occurring also on the Atlantic Coastal Plain of North America probably as relics. It is to be noted that both occur at Quiddy Viddy Lake, Newfoundland.

Specimens examined.—NEWFOUNDLAND: Quiddy Viddy (Quidi Vidi) Lake, *Waghorne* in 1899, *Can, NY, Robinson & Schrenck 31* in 1894, *NY, GH, Mo, PA, Can, C. S. Williamson 745, NY, PA;* between Quiddy Viddy Lake and Middle Cove, Avalon Peninsula, *Fernald & Wiegand 5423, GH;* Carbonear, Shores of Conception Bay, Avalon Peninsula, *Fernald & Wiegand 5724, NY, GH, PA;* Channel, *Howe and Lang (Long?) 959, NY;* Torbay, *Howe & Lang 1458, NY;* New Harbor, *Waghorne* in 1890, *GH;* Murray's Pond, southeastern Newfoundland, *Ayre* in 1931, *GH;* St. John's *Ayre* in 1931, *GH.*

PENNSYLVANIA: CHESTER CO. See's Bridge, *Wilkens 161* in 1929, *GH.*

MARYLAND: PRINCE GEORGE CO. Confluence of Western Branch with the main Patuxent River, *Morris 919, Pom-B, HGr, NY, GH, Mo, PA;* Patuxent River 4 miles below Western Branch, *Morris 1470, HGr, NY, GH, Mo, PA.* CHARLES CO. Pasquehanza Creek, *Greene* in 1897, *HGr.*

VIRGINIA: WESTMORELAND CO. Stratford Cliffs, Potomac River, *Blake 11747, GH;* Kinsale, *Freeman* in 1935, *USNA.* NEW KENT CO. Lanexa, *Richmond* in 1938, *GH.* WARWICK CO. Hampton, *Chickering* in 1877, *NY,* in 1878, *NY, Morong* in 1877, *NY,*

Vasey in 1878, *PA*, *Churchill* in 1891, *Mo*, in 1894, *GH*. NORFOLK CO. Norfolk, *McMinn* in 1870, *PA*, *GH* (collector's name omitted), *Churchill* in 1891, *Mo*. PRINCESS ANNE CO. South of Virginia Beach, *Britton & Small* in 1893, *NY*, *PA*, *UPa*; False Cape, *Fernald & Long 4642*, *GH*; Back Bay south of False Cape (with strictly indigenous associates), *Fernald & Long 3937*, *GH*, *UPa*.

SOUTH CAROLINA: Charleston, *Durand Herbarium*, *PA*.

Type collection.—"*Habitat in aquis vadosis*, Angliae, Belgii." *R. hederaceus* var. *hederaefolius* Lawson, Trans. Roy. Soc. Can. 2(4): 44-45. 1884, was based upon an Old World type, *R. hederaefolius* Salisb. Prodr. Stirp. 373. 1796.

89 RANUNCULUS LOBBII (Hiern) A. Gray, Proc. Am. Acad. 21: 364. 1886

R. Hydrocharis Spenn. f. *Lobbii* Hiern, Jour. Bot. Brit. & For. 9: 66. *pl. 14*. 1871. *R. hederaceus* var. *Lobbii*. Brew. & Wats. Bot. Calif. 1: 5. 1876. *R. aquatilis* L. var. *Lobbii* S. Wats. Bibl Ind. N. Amer. Bot. 1: 17. 1878. *Batrachium Lobbii* Howell, Fl. N. W. Am. 1: 13. 1897.

Glabrous aquatic annuals; roots 0.2 mm. in diameter; stem floating, rooting at the lower nodes, 1-10 dm. long, 1-2 mm. in diameter, branching, containing air spaces in the cortex, the stele far inward; lower leaf blades submersed, dissected into filiform divisions 0.1-0.3 mm. broad, collapsing when withdrawn from the water, 1-4 cm. long, 3-5 cm. broad; upper leaves floating, simple, 5-8 mm. long, 2.5-5 mm. broad, deeply parted into 3 equal, elliptic, sharply divergent parts, the lateral parts shallowly again 2-lobed, the leaf proximally cordate and each part or lobe distally rounded, the petioles 1-3 cm. long, the stipular leaf bases cuneate, 3 mm. long, 3 mm. broad; cauline leaves alternate, petioled; pedicels 5-10 mm. long in flower, 8-20 mm. long in fruit, glabrous; sepals light green, spreading, ovate, 2-3 mm. long, 1.5 mm. broad, glabrous, half the length of the petals, promptly deciduous, white-margined; petals 5, white, 4-6 mm. long, 1.5-2.5 mm. broad, the nectary scale forming a minute shallow pocket; stamens 5-15; achenes 4-6 in a cluster, each achene obovoid, 2.5 mm. long, 1.6 mm. dorsoventrally, 0.8 mm. laterally, with rough transverse ridges on both faces, glabrous, the margin inconspicuous, the style 1.5 mm. long in anthesis, deciduous, leaving an achene beak 0.2-0.3 mm. long, the achene body bulging beyond the base of the beak; receptacle conical, 0.5-1 mm. long in flower, about 1 mm. long in fruit, glabrous.

Shallow vernal pools near sea level; Pacific Forest and edge of the California Oak Woodland. Vancouver Island, British Columbia; Corvallis, Oregon; California from Sonoma and western Lake counties and the Vaca Mountains, Solano County, to the Santa Cruz Mountains and Alameda County. Late February to early May.

Significant specimens.—BRITISH COLUMBIA: Vancouver Island. Near Victoria, *Macoun* in 1908, *Geol. Surv. Can. 77391*, *HGr*, *Can*, *NY*, *GH*; Langford, Vancouver Island, *Newcombe* in 1919, *WSC* in 1921, *WSC*; Colwood, *Newcombe* in 1919, *GH*, *Pom*.

OREGON: WASCO CO. The Dalles, *Sukhdorf* in 1898, *WSC*. BENTON CO. Corvallis, *Gilkey* in 1934, *OSC*, *Wash*, *GH*.

CALIFORNIA: LAKE CO. Scotts Valley, *Blankinship* in 1923, *CAS*, *Carnegie Library*, *Lakeport*, Calif. SOLANO CO. Nita Pond, Pine Peak, Vaca Mountains, *Jepson* in 1892, *J*, *Ill* ("Vaca Mts."), *NY* ("Vacaville").

Type collection.—"Oregon, *W. Lobb.* 1852. *n. 249.*"

90 RANUNCULUS AQUATILIS L.

Glabrous or hispidulous aquatic perennials; roots 0.3-0.4 mm. in diameter; stems submersed, rooting at the lowest nodes, 2-6 or rarely 20 dm. long, 0.5 or 1-2.5 mm. in diameter, branching, with large air chambers present in the cortex, the vascular system far in the interior, the stem sometimes hispidulous; leaves usually all cauline, alternate, leaf blades often all submersed and finely dissected into filiform divisions, usually repeatedly trichotomous, the leaf as a whole not globular, usually but not necessarily collapsing when withdrawn from the water, 2-4 cm. long, 3-5 cm. broad, or the upper leaves floating, simple, reniform in outline, 0.5-1.5 mm. long, 1.5-2.5 cm. broad, 3-lobed and again lobed or parted and lobed, with broad stipular bases; petioles 0.2-3 cm. long, including the stipular leaf bases, which in the submersed leaves are 2-5 mm. long (these sometimes bordering the entire petiole but usually not so); leaves somewhat shorter than the internodes or exceding them, pedicels stout, 1-2 cm. long in flower, 1.5-3 cm. long in fruit, not reflexed in fruit, glabrous; sepals 5, light green, spreading, ovate, 2-3 mm. long or longer in var. *typicus*, 1-1.8 mm. broad, glabrous, half the length of the petals, deciduous before the corolla; petals 5, white or the bases yellow, 4-8 or 14 mm. long, 1.5-2 mm. broad, the nectary scale glabrous, forming a shallow pocket or sometimes greatly reduced; stamens 5 or 10-25; achenes usually 10-20 in a globose cluster, each achene obovoid, 1-1.5 or rarely (at least in America) 2-2.5 mm. long, usually 1-1.5 mm. dorsoventrally, or 0.5-0.7 mm. laterally, roughly transversely-ridged, glabrous from the beginning or the pistils hispid and the achenes glabrate or with some hairs persisting on or near the dorsal sutures, the margins rather sharp, the style deciduous, the achene beak about 0.1-0.3 mm. long; receptacle subglobose, 1 mm. long in flower, 1 mm. long in fruit, densely pubescent.

The varieties of this species and *R. circinatus* are in need of further study from a broader point of view. Correlation of New and Old World types is still very weak, and a study of the subgenus *Batrachium* as a whole is necessary. *R. aquatilis* var. *capillaceus* is not completely distinct from *R. circinatus* var. *subrigidus*, which is a connecting link between the species.

90a RANUNCULUS AQUATILIS var. TYPICUS*

R. aquatilis L. Sp. Pl. 556. 1753.

Old World; not represented in North America.

Type collection.—"*Habitat in* Europae *aquis undosis, fossis, rivulis.*"

90b RANUNCULUS AQUATILIS var. HISPIDULUS E. Drew,* Bull. Torrey Club 16: 150. 1899 (Very liberal policy: *R. Grayanus* Freyn.)

R. aqualilis L. "form" *heterophyllus* A. Gray, Proc. Amer. Acad. 21: 363. 1886. *R. Grayanus* Freyn, Deuts. Bot. Monatss. 8: 179. 1890. *Batrachium Grayanum* Rydb. Fl. Rocky Mts. & Adj. Plains 294. 1917. *R. trichophyllus* var. *hispidulus* W. Drew, Rhodora 38: 29. 1936.

Ponds, ditches and vernal streams and pools at low elevations along the

* Cf. Table 15.

coast and up to 3,000 to 6,000 feet elevation in the interior, practically confined to the Pacific (Coniferous) Forest from which var. *capillaceus* is almost excluded. Pacific Slope; Alaska (Aleutian Islands, Alaska Peninsula, and adjacent islands); British Columbia to Monterey and Mariposa counties, California; in modified form at Cuyamaca Lake, San Diego County, California; occasional in Eastern Washington and Oregon, in extreme northern Idaho and adjacent Montana; rare and modified in Mackenzie, Utah, Montana, and Wyoming. April to July.

A form occurring in isolation at Cuyamaca Lake and Julian in San Diego County, California, is unusually robust, and it has floating leaves as follows: 1-1.5 cm. long (measured from attachment of petiole to apex as in vars. *typicus* and *hispidulus*), 2-3 cm. broad, deeply 3-parted, the parts again lobed, the ultimate lobes about equal whether secondary or tertiary, rounded, the base of the leaf very deeply cordate, the basal sinus very narrow, 1 cm. long. The achenes are about 1.8 mm. long. This plant may be worthy of varietal status. Specimens are as follows: Cuyamaca Lake, *Abrams 3917, DS, NY, GH,* (not *Pom*), *Munz & Harwood 7204, Pom, NY, UC, GH, Peirson, Gander 2858, SD;* Pine Hills, Julian, *Gander 4122, SD.*

The form occurring sparingly in Utah and rarely in the District of Mackenzie, Montana, and Wyoming has slightly to markedly more laciniately divided floating leaves and the lobes more sharply acute. Varietal status would be dubious. Specimens are as follows:

MACKENZIE: McTavish Arm, Hunter Bay, Great Bear Lake, 66° 12′ N, 117° 30′ W, *A. E. & R. T. Porsild 5299, Can.*

UTAH: CACHE CO. Dry Lake, *Maguire 15369* in 1936, *WSC, Utah, DM, Wash, GH.* SUMMMIT CO. Uintah Mountains. West Fork of Bear River, *E. B. & L. B. Payson 4848, NY, RM, GH, Mo, WSC, PA, Goodman 409* in 1928, *RM;* Mill Creek (Summit Co. ?), *E. B. & L. B. Payson 4949, US.* BEAVER CO. Delano Peak, Tushar Range, *Maguire 17364* in 1939, *Utah, RM;* Otter Lake, South Fork of Beaver Canyon, *Maguire 17611* in 1939, *Utah, WSC, GH.* SAN JUAN CO. Trail to La Sal Pass, 8,000 feet, *Maguire & Redd 1812* in 1932, *UC, Mo, GH, RM, Utah.*

MONTANA: FLATHEAD CO. Columbia Falls, *R. S. Williams* in 1894, *NY, RM, GH.* LAKE CO. Pond near Ninepipes Lake, Mission Valley, *L. Benson 13074, Pom.*

WYOMING: Junction Butte, Camp Roosevelt, *Conard 1369, RM.*

Significant specimens.—ALASKA: Unalaska, *J. P. Anderson 4236, Pom-B, ISC;* Nagai Island, Shumigan Islands, *Harrington* in 1871-2, *GH, Macoun* in 1892, *Geol. Surv. Can. 18931, Can, GH.*

WASHINGTON: (Common west of the Cascade Mountains.) STEVENS CO. Turtle Lake, *Spiegelberg 123* in 1923, *RM, GH.* SPOKANE CO. *Suksdorf* in 1885, *WSC;* Rock Creek, *Sandberg & Leiberg 90, GH, US, CAS;* Spokane, *Large 44, WSC.* WHITMAN CO. Pullman, *Elmer 841, NY, Pom, WSC, Ill, US, Hull 409* in 1892, *WSC, Mo;* Palouse, *Beattie 4187, WSC, US.* YAKIMA CO. Falcon Valley, Mt. Adams, *Suksdorf 1960, NY, WSC, 10074, NY, WSC, GH.* WALLA WALLA CO. Walla Walla, *Brandegee 606, GH, UC.*

OREGON: (Common west of the Cascade Mountains.) LAKE CO. Lakeview, *C. L. Hitchcock 6736, Wash, WSC, Utah, Pom;* Crane Mountains, *Ferris & Duthie 227, DS.* MALHEUR CO. Riley, *Peck 13891, WillU, DS.*

CALIFORNIA: Common in and near the Pacific Forest in the coastal counties as far south as the San Francisco Bay Region and Monterey County. The following specimens from the interior: LAKE CO. Scotts Valley, *Blankinship* in 1923, *Carnegie Library, Lakeport,* Calif.; Kelseyville, *Blankinship* in 1923, *Carnegie Library, Lakeport,* Calif.; West Base of Mt. Konocti, Breen's Lake, *L. Benson 4313, Pom-B.* SANTA CLARA CO.

TABLE 15.—Varieties of *Ranunculus aquatilis* L.

Var. *typicus*	Var. *hispidulus*	Var. *Porteri*	Var. *Harrisii*	Var. *capillaceus*	Var. *calvescens*	Var. *eradicatus*
Stems 1-2.5 mm. in diameter.	Stems 1-2 mm. in diameter.	Stems 1-2 mm, in diameter.	Stems 2-5 mm. in diameter.	Stems 1-2 or 2.5 mm. in diameter, mostly stouter than in var. *calvescens*.	Stems 1-2 mm. in diameter, usually slender.	Stems 0.4-1 mm. in diameter.
Floating leaves nearly always present, simple, 1-1.5 cm. long, 1.5-2 cm. broad, 3-parted or -divided and again parted and lobed; submersed, dissected leaves longer than the internodes, the segments capillary.	Floating leaves 1-10, simple, 0.5-1 cm. long, 1-2 cm. broad, 3-lobed or -deeply-parted, the lobes again forked or parted, the ultimate lobes acute to rounded, the bases usually shallowly cordate, the basal sinuses open; submersed leaves usually shorter than the internodes, the segments capillary.	Floating leaves none; submersed dissected leaves usually shorter than the internodes, petioled, collapsing when withdrawn from the water, not circinate, about 3 times parted or divided (in the other varieties 4-7-times), the divisions not capillary, 0.5-1.5 mm. broad (in the other varieties capillary, usually 0.1-0.3 mm. broad except in some emersed forms).	Floating leaves none; submersed dissected leaves shorter than or slightly exceeding the internodes, collapsing when withdrawn from the water, very large, 2.5-5 cm. long, the upper ones mostly sessile on the stipular leaf bases, the lower ones broadly petioled, the stipular leaf bases remarkably large and conspicuous, 8-10 mm. broad, the leaf segments filiform.	Floating leaves none; submersed dissected leaves usually shorter than or equal to the internodes, the segments capillary.	Floating leaves none; submersed dissected leaves shorter than the internodes, the segments finely capillary.	Floating leaves none; submersed dissected leaves shorter than the internodes, the segments very finely capillary.

TABLE 15.—(*Continued.*)

Var. *typicus*	Var. *hispidulus*	Var. *Porteri*	Var. *Harrisii*	Var. *capillaceus*	Var. *calvescens*	Var. *eradicatus*
Petals 9-14 mm. long.	Petals 4-6 mm. long.	Petals 4-7 mm. long.	Petals about 8 mm. long.	Petals 4-8 mm. long.	Petals 4-6 mm. long.	Petals 4-6 mm. long.
Stamens about 30.	Stamens 10-25.	Stamens about 20.	Stamens 10-15.	Stamens 10-25.	Stamens 10-25.	Stamens 5-8.
Achenes 20-40, 1.5-2 mm. long, glabrous or hispidulous.	Achenes mostly 15-25, 1-1.5 mm. long, glabrous.	Achenes mostly 10-15, 1.8 mm. long, hispidulous, the transverse ridges comparatively weak.	Achenes 15-25, 2.3-2.5 mm. long, sparsely hispidulous on the apices of the dorsal sutures.	Achenes mostly 15-25, 1-1.5 mm. long, glabrous or subglabrate.	Achenes mostly 15-25, 1.5-1.8 mm. long.	Achenes 10-20, 1 mm. long, glabrous.
Receptacle hirsutulous, the hairs tufted.	Receptacle hirsutulous, the hairs tufted.	Receptacle rather sparsely hispidulous.	Receptacle hispidulous.	Receptacle hirsutulous, the hairs tufted.	Receptacle glabrous or the sparse hairs not tufted.	Receptacle hirsutulous, the hairs tufted.
Old World.	Pacific Forest from Alaska to California and sparingly to Utah and Wyoming.	Southeastern Idaho.	Eastern Oregon and far northern California.	Alaska to Labrador, Baja California, Kentucky and New York; Old World.	New England; rare from Quebec to Minnesota and Pennsylvania.	Circumpolar in Arctic regions.

Summit of Mt. Day Ridge, Mt. Hamilton Range, *H. K. Sharsmith 3671, UC, Pom-B.* SACRAMENTO CO. Folsom, *Ramaley 11309, UC.* SAN JOAQUIN CO. Live Oak, *Rattan* in 1903, *DS.* MODOC CO. Canby, *Eastwood & Howell 8219, CAS, Pom.* SHASTA CO. Anderson, *L. E. Smith* in 1915, *CAS.* BUTTE CO. *Bruce* in 1892, *NY;* Clear Creek, *H. E. Brown 161½, NY, DS, Mo, HGr, RM.* PLUMAS CO. *E. P. Ames* in 1873, *GH;* Prattville, *M. E. Jones* in 1897, *Pom, NY, GH.* EL DORADO CO. New York Ravine, *K. Brandegee* in 1907, *UC.* AMADOR CO. Ione, *Greene* in 1889, *NY, Eastwood 10109, CAS.* CALAVERAS CO. Calaveritas Creek, *J. P. Tracy 5683, UC;* 2 miles south of Angel's Camp on road to Sonora, *Wolf 4896, SD.* TUOLUMNE CO. Keystone, *Abrams 10063, NY, DS;* Hog Ranch, Mather, *Mason 2120, UC.* MARIPOSA CO. *Seale* in 1929, *CAS.*

IDAHO: BONNER CO. Ellisport Bay, north end Lake Pend Oreille, *Leiberg 416, US, HGr.* KOOTENAI CO. *Sandberg* in 1892, *Ill, Mo;* Harrison, Valley of Coeur d' Alene River, *Sandberg, MacDougal, & Heller 645, Pom, CAS, DS, GH;* Forks of St. Maries River, *Leiberg 1169, CAS, Pom, DS;* Clarkia Ranger Station, St. Maries River, *Quick 1155, UC.*

NEVADA: ELKO CO. 76 Mile Creek, near Charleston, *Holmgren 1694, Utah.*

MONTANA: Flathead River, *MacDougal 456.*

Type collections.—(1) Var. *hispidulus*, "In ponds at Jarnigan's, Mad River [Humboldt Co., Calif.], July 10." *Chestnut & Drew* in 1888. Topotype, *Chestnut & Drew*, July 21, 1888, *UC 13972.* Another collection, *HGr*, is either an isotype or a topotype. (2) *R. Grayanus*, "*British Columbia.* Teich bei Lytton, auf Granit in 80-100 m. Seehöhe . . . July 1887 [No. 331 p. p.]."

90c **Ranunculus aquatilis** var. **Porteri** (Britt.) L. Benson, comb. nov.*

(Liberal policy: *R. Porteri* Britt. or var. of *R. trichophyllus* Chaix.)

R. Porteri Britt. Bull. Torrey Club 17: 310. 1890. *Batrachium Porteri* Britt. in Rydb. Fl. Rocky Mts. & Adj. Plains 294. 1917.

Ponds, lakes, and streams at about 5,000 feet elevation. Southeastern Idaho in Fremont and Bannock counties.

Specimens examined.—IDAHO: FREMONT CO. Henry's Fork of Snake River at St. Anthony, *Cronquist 1494, ISB, Utah, Mo;* Henry's Fork, *Porter, PA, NY* (type collection, cf. below); Buffalo River at Pond's Resort, *R. J. Davis* in 1935, *ISB;* Buffalo River 35 miles north of Ashton, *Maguire 17073* in 1939, *Utah.* BANNOCK CO. U. S. 91 east of Oxford, *Maguire 3389* in 1932, *Utah.*

Type collection.—" 'Henry's Fork, No. 1062; *Ranunculus*, entirely immersed.' It was collected on the Hayden Survey of the territories, but I cannot place the exact locality." "I noticed the plant in Dr. Porter's Herbarium a year or so ago." Collected by *Thomas C. Porter.* Type, *PA* (one fragment is var. *capillaceus*), photograph *Pom-B;* isotype or portion of the type, *NY*, photograph, *GH.* According to Britton, the type was collected in southwestern Wyoming; according to Rydberg, in southeastern Idaho, there being two Henry's Forks. Probably, in view of more recent collections, the type came from Idaho.

90d **Ranunculus aquatilis** var. **Harrisii** L. Benson, var. nov.*

(Moderate or liberal policy: specific rank)

Caulibus 2-5 mm. diametro; foliis submersis flaccidis, 2.5-5 cm. longis; foliis superioris sessilis; foliis inferioris petiolatis; stipulis 8-10 mm. latis; petalis circa 8 mm. longis; staminis 10-15; acheniis 15-25, 2.3-2.5 mm. longis hispidis; receptaculo hispidulo.

* Cf. Table 15.

Aquatic in the mountains of Eastern Oregon and far northern California. Summer.

Specimens examined.—OREGON: Shirk, *Leiberg, 2586, Pom, GH, NY, UC, US.* GRANT CO. Prairie City, *Henderson 5448, GH.*

CALIFORNIA: HUMBOLDT CO. Buck Mountain, *Harris, Tracy, & Yates 2453, GH,* photograph *Pom-B,* (type, cf. below). SHASTA CO. Hat Creek, *Eggleston 7521, GH, US;* Junction of the Burney, Redding, Alturas Highway, 22 miles south of McCloud, *Cantelow* in 1939, *Pom, CAS.*

Type collection.—Northwest slopes of Buck Mountain, about 2,700 feet elevation, Humboldt County, California, *S. K. Harris, J. P. Tracy, & H. S. Yates 2453,* June 17, 1936, *GH* (type), photograph *Pom-B.* The name is in honor of Dr. Stuart K. Harris, one of the collectors of the type specimen. Through the kindness of Dr. Harris, the writer obtained photographs of several of E. L. Greene's specimens of species of *Ranunculus* during a visit to the Herbarium Greeneanum of the University of Notre Dame in 1935.

90e RANUNCULUS AQUATILIS L. var. CAPILLACEUS (Thuill.)* DC. Prodr. 1: 26. 1824 (Liberal policy: *R. trichophyllus* Chaix.)

R. trichophyllus Chaix, in Vill. Hist. Pl. Dauph. 1:335. 1786. *R. capillaceus* Thuill. Fl. Par. ed. 1. 1: 278. 1799. *R. amphibius* James, Long Exped. Rocky Mts. 1: 498. 1823. *R. aquatilis* var. *brachypus* Hook. & Arn. Bot. Beech Voy. 316. 1840. *Batrachium trichophyllum* F. Schultz, Arch. Fl. France et All. 1: 107. 1848. *R. aquatilis* var. *trichophyllus* A. Gray, Man. Bot. ed. 5. 40. 1867. *R. hydrocharis* Spenn. f. *trichophyllus* Hiern. Journ. Bot. Brit. & For. 9: 101. 1871. *Batrachium Bakeri* Greene ex Baker, W. Amer. Pl. 1: 7. 1902, nom. nud. *Batrachium Bakeri* Greene, Leafl. Bot. Obs. & Crit. 1: 95. 1904. *Batrachium pedunculare* Greene, *loc. cit. Batrachium aquatile* (L.) Wimm. var. *trichophyllum* Frye & Riggs, N. W. Fl. 169. 1912. *Batrachium aquatile capillaceum* Garrett, Spring Fl. Wasatch Reg. ed. 3. 35. 1917. *R. aquatilis* var. *Bakeri* Jepson, Fl. Calif. 1: 544. 1922. *R. aquatilis* var. *peduncularis* Jepson, *loc. cit. R. trichophyllus* var. *typicus* W. Drew, Rhodora 38: 18. 1936.

Ponds, ditches, vernal streams, and pools at low elevations along the coast and up to 3,000 to 6,000 feet elevation in the interior; Old World; Aleutian Islands and the Alaskan Mainland to Labrador and Nova Scotia and southward to California (not in the Pacific Forest), Kansas, Kentucky, West Virginia (Hardy County), and the vicinity of New York City; rare in New England; occurring in Mexico in northern Baja California and at El Salto, Durango. Spring and summer.

A form with greatly elongated leaves and leaf-divisions has been collected "in a brook near Village Green, *Fernald, Long & St. John 7478, PA.*"

Significant specimens.—WASHINGTON: Common east of the Cascade Mountains, the following from Western Washington: CLALLAM CO. Lake Crescent, *G. N. Jones 3554, Wash, 3596, Wash;* Lake Ozette, *J. W. Thompson 9420, NY, Wash, Pom-B, DS, Mo.* JEFFERSON CO. Port Crescent, *Lawrence 380, WSC;* Hoodsport, *J. W. Thompson 660½, Wash, Mo.* GRAYS HARBOR CO. Montesano, *J. M. Grant* in 1917, *DS, UC, NY;* Gray's Harbor, *Wilkes Expedition* in 1838-42, *NY;* Quiniault, *Conard 317* in 1902, *NY.* MASON CO. Lake Cushman, *St. John & Schienfurth 5158, WSC.* KING CO. Seattle, *Piper* in 1889, *Wash, E. C. Smith* in 1899, *Mo;* Union Bay, Seattle, *Frye* in 1907, *Wash.* PIERCE CO. Tacoma, *Flett* in 1896, *Wash;* Muck Creek, *G. N. Jones 4618, Wash.* LEWIS CO. Walput Lake, 4,000 feet, *J. W. Thompson 15176½, Wash, Pom-B.*

* Cf. Table 15.

OREGON: Common in Eastern Oregon. MARION CO. Lake Labiche, *Gorman 4043, WSC.* BENTON CO. Corvallis, *Applewhite* in 1904, *OSC.* WASHINGTON CO. Forest Grove, *J. W. Thompson 602, Wash, DC.* YAMHILL CO. Carlton, *Gorman 5720, WSC.* CLACKAMAS CO. Clackamas, *Howell* in 1903, *NY;* Oswego, *Howell* in 1902, *NY.*

CALIFORNIA: Common, except in the Pacific Forest. The following are noteworthy: MENDOCINO CO. 5 miles east of Point Arena, *L. S. Rose 39155* in 1939, *GH.* SAN BERNARDINO CO. Mojave River at Victorville, *Parish 10529, DS.*

UTAH: This plant seems to be common. Central Utah, *Parry* in 1875, *NY;* Benson Ward, 4,000 feet *Watt (?)* in 1903, *Utah.* CACHE CO. Collinston, *Somers* in 1935, *Utah, WSC, RM.* SALT LAKE CO. *Garrett 2679, NY;* Salt Lake City, *M. E. Jones* in 1880, *Pom.* SUMMIT CO. West Grass Lake, King's Peak-Gilbert Peak Region, Henry's Fork Basin, *Maguire, Robson, & Maguire 14726* in 1936, *Utah, WSC.* UINTAH CO. Iron Springs, Uintah Mountains, *Maguire 17662* in 1939, *Utah.* BEAVER CO. Otter Lake, South Fork of Beaver Canyon, *Maguire 17606* in 1939, *Utah, WSC.* GARFIELD CO. Panguitch Lake, *M. E. Jones* in 1894, *Pom.* WASHINGTON CO. Pine Valley, *Gould 1864, Pom.*

ARIZONA: Little Colorado River, *Goodding 643, RM, GH;* Beaver Creek, *Rusby* in 1883, *NY.* COCONINO CO. Oak Creek, *MacDougal* in 1891, *NY.* APACHE CO. Little Colorado River, White Mountains, *Goodding 643, NY;* Baldy, White Mountains, *Peebles & Smith 12490, Sac.* YAVAPAI CO. 15 miles southwest of Long Valley Junction, *Peebles 14409, Sac, Pom-B.*

NEW MEXICO: Elizabethtown, *Castetter 1805* in 1932, *RM.* BERNALILLO CO. Albuquerque, *Castetter 2158, RM.* SAN MIGUEL CO. Las Vegas, *Letterman* in 1881, *Mo;* Gallenas River, Las Vegas Hot Springs, *Sturgis* in 1902, *NY.* CATRON CO. Willow Creek, Mogollon Mountains, *Wolf 2652, GH, DS.* SOCORRO CO. Middle Fork of the Gila River, Mogollon Mountains, *Metcalfe 455* in 1903, *Pom, RM, GH, Mo, 456* in 1903, *RM, Pom, GH, Mo, NY;* between Willow Creek and White Creek Ranger Station, *Eggleston 16851, NY.* GRANT CO. South end of Black Range, *Metcalfe 1047, Pom* (not *GH, Mo*).

WEST VIRGINIA: HARDY CO. Cacapon River, *Berkeley 1624* in 1930, *Mo* (apparently this plant, but no flowers or fruit); Cacapon River above Wardensville, *Berkeley 1707* in 1930, *Mo.*

MEXICO: BAJA CALIFORNIA: *Orcutt* in 1882, *SD, F;* Topo, *Orcutt (501 or 1182),* July 9, 1884, *Mo, US, F, NY, GH;* Valle de las Palmas, *Orcutt* in 1882, *Mo;* La Encantada Sierra San Pedro Martir, *Brandegee* in 1893, *F, Wiggins & Demaree 4918, DS, Pom-B.*

DURANGO: El Salto (Asserraderos), *Pennell 18280, US.*

Type collections.—(1) *R. trichophyllus,* "*trichophyllus* (mihi) Hall. 1162: in rivulis limpidis, Valgaud, Devoluy." For valid publication, the species depends upon the reference to Haller's 1162 (Hist. Stirp. Indig. Helv. 2: 69. 1768.), "RANUNCULUS caule fluitante, petiolis unifloris, folius capillaribus, laciniis divergentibus," for Chaix gave no description of the plant. Haller's references to this plant ("Frequentissimus in rivulis quietis . . . Switzerland") are capable of several interpretations, and there has been much confusion about them. However, as pointed out by W. B. Drew, Rhodora. 38: 21-23. 1936, the common usage has been to attribute the name *Ranunculus trichophyllus* to the common dissected-leaved plant of Switzerland and much of Europe. (2) *R. capillaceus,* based upon *Haller 1162,* and therefore upon the same type as *R. trichophyllus.* (3) *R. amphibius,* Platte River, west of the mouth of Portera's Creek. Pistils hairy (possibly *R. circinatus* var. *subrigidus*). Type collection, *NY.* (4) Var. *brachypus,* "California-Supplement. Where not otherwise mentioned, it is to be understood that the following species are from the collection of Mr. Douglas. They were presented by the Horticultural Society of London, in whose service Mr. Douglas was at the time he gathered them." Isotype, *GH,* photograph *Pom-B.* (5) *B. Bakeri,* "Pools among the hills of the Coast Range near Stanford University [California], 8 May, 1902, C. F. Baker, distributed under n. 786." Type, *HGr;* isotypes, *Pom 150521, CAS 134458, UC, US 419190.* (6) *B. pedunculare,* Near Lakeport, Lake Co. [California], 9 May, 1902, C. F. Baker, distributde under n. 3062." Type, *HGr*

3026; isotypes, *Pom 150525, NY, CAS 134466, UC 135533, GH, RM 43380, US 440903, 967173, 1177367.* (7) Var. *typicus*, based upon *R. trichophyllus* Chaix. In addition to the names given in synonymy various new combinations of old European names have been made in America (*Batrachium aquatile pantothrix* Piper Contr. U. S. Nat. Herb. 11: 270. 1906, based upon *R. pantothrix* Brot. Fl. Lusit. 2: 375. 1804. *Batrachium aquatile flaccidum Cockerell* in Daniels, Fl. Boulder, Colo. 122. 1911, and *Ranunculus aquatilis* L. var *flaccidus* Rob. in A. Gray, Syn. Fl. N. Amer. 1: 21. 1895, based upon *R. flaccidus* Pers. in Usteri, Ann. Bot. 5: 39. 1795. *Batrachium aquatile caespitosum* Piper, Contr. U. S. Nat. Herb. 11: 270. 1906 and *Batrachium trichophyllum caespitosum* Britt. & Brown, Ill. Fl. 2: 84. 1897, were based upon *Ranunculus caespitosus* Thuill. Fl. Env. Paris ed. 2. 278. 1799. *Ranunculus aquatilis* L. var. *Drouetii* Lawson, Trans. Roy. Soc. Can. 2: 45. 1884, based upon *Ranunculus Drouetii* F. Schultz, Arch. Fl. France et All. 1: 107. 1848. *Ranunculus divaricatus* Schrank has been used also under various combinations for this plant.

90f RANUNCULUS AQUATILIS var. CALVESCENS (W. Drew) L. Benson*

Bull. Torrey Club 69: 384. 1942 (Liberal policy: *R. trichophyllus* Chaix var. *calvescens* W. Drew)

R. trichophyllus Chaix var. *calvescens* W. Drew, Rhodora 38: 32. 1936.

Northern and Deciduous forests. Chiefly in New Brunswick, Nova Scotia and New England; rare in Ontario, Quebec, Minnesota, Michigan, New York, Pennsylvania and New Jersey. June to August.

Significant specimens.—ONTARIO: Mary Louise Creek, Sibley Township, Thunder Bay District, *Taylor, Losee, & Bannan 902, GH, Utah, Can;* Surprise Lake, Sibley Township, Thunder Bay District, *Taylor, Losee, & Bannan 901, Clo, GH, Can, DS.*

QUEBEC: Lake Temiscouata, *Victorin 97* in 1913, *GH.*

MINNESOTA: ST. LOUIS CO. Moyle *2390, UPa.*

MICHIGAN: KENEEWAH CO. *Farwell 134* in 1886, *GH;* Isle Royle, *W. S. Cooper* in 1909, *GH.*

NEW YORK: Hartsdale, *Shear* in 1890, *RM.* HERKIMER CO. Cohasset, *House 6697, NY.* WASHINGTON CO. Cossayuna Lake, *Muenscher & Lindsey 3327, 3328, GH, Mo.* ORANGE CO. Montgomery, *E. & H. N. Moldenke 11111, Pom, NY.* NASSAU CO. Massatavum Creek, Massapequa Pond, *Muenscher & Curtis 6164, GH.* SUFFOLK CO. Long Island. Riverhead, *E. S. Miller* in 1877, *Mo, PA.*

PENNSYLVANIA: Buttermilk Falls, *S. Brown* in 1898, *PA.* SUSQUEHANNA CO. Dunn's Pond, *Saunders* in 1900, *PA.*. WAYNE CO. Orson, *Fogg 11011, UPa.* MONROE CO. "Waters of Tobyhanna," *Porter* in 1857, *PA;* Stroudsburg, *C. S. Williamson* in 1900, *PA.* DELAWARE CO. Fleischman, *Schrenk* in 1893, *Mo.*

NEW JERSEY: Big Spring, Springdale, *Mackenzie* in 1920, *PA, NY, Svenson 6738, GH.* MORRIS CO. Between Netcong and Cranberry Lake, *Pretz 1875, PA.*

Type collection.—"MASSACHUSETTS: Cram's River, Danvers, July 2, 1885, *J. H. Sears.* (TYPE in Gray Herb.)"

90g RANUNCULUS AQUATILIS var. ERADICATUS Laestad.*

N. Act. Reg. Soc. Scient. Ups. 11: 242. 1839

Batrachium eradicatum Fries, Bot. Notis. 114. 1843, nom. nud. *B. confervoides* Fries, Bot. Notis. 121. 1845. *R. confervoides* Frees, Summa Veg. Scand. 1. 139. 1845. *R. paucistamineus* Tausch var. *borealis* Beurl. Bot. Notis. 156. 1852. *R. hydrocharis* Spenn. f. *confervoides* Hiern, Jour. Bot. Brit. & For. 9: 102. 1871. *R. aquatilis* var. *confervoides* Lawson, Trans. Roy. Soc. Canada 2(4): 45. 1884. *B. paucistamineum*

* Cf. Table 15.

(Tausch) F. Schultz var. *eradicatum* Gelert. Bot Tidstk. 19: 28. 1894. *R. aquatilis* L. var. *confervoides* Rob. in A. Gray, Syn. Fl. N. Amer. 1: 21. 1895. *R. divaricatus* Schrank var. *eradicatus* Williams, Jour. Bot. Brit. & For. 46: 21. 1908. *R. flaccidus* Pers. var. *confervoides* Hegi, Ill. Fl. Mittel-Eur. 3: 584. f. 708k. 1912. *B. confervoides* Rydb. Fl. Rocky Mts. & Adj. Plains 294. 1917. *R. trichophyllus* Chaix var. *eradicatus* Laestad. ex Ostenfeld, Meddel. Grønl. 64: 202. 1923. *R. paucistamineus* var. *eradicatus* (Laest.) Gelert f. *terrestris* Porsild, Meddel. Grønl. 58: 77. 1926. *R. trichophyllus* Chaix var. *eradicatus* W. Drew, Rhodora 38: 33. 1936.

Stagnant water; Arctic Grassland and Tundra and edge of the Northern Forest. Circumpolar; Arctic America from Alaska to Baffin Land, Labrador, Newfoundland, Greenland, Iceland, and far northern Manitoba and Quebec. Occurring southward in forms intergrading with var. *capillaceus*. July and August.

The following is quoted from Sørensen, Meddel. Grønl. 101 (3): 58. 1933, "As regards the hibernation, it is noteworthy that the plant endures the severe frost in an entirely desiccated state. Thus I have encountered it on dusty ground without snow-covering in the month of February. That it did actually withstand these conditions was evidenced by the fact that it grew abundantly in the same place the following summer." The reference was under *R. trichophyllus* but undoubtedly it dealt with var. *eradicatus*, since the material referred to *R. aquatilis* var. *capillaceus* (*R. trichophyllus*) examined by writer has turned out to be consistently thus far var. *eradicatus*. It may be possible of course that the new plants grew from seeds in the soil, and observation at the beginning of summer growth would be necessary to determine this point.

Significant specimen.—MANITOBA: Churchill, *Polunin 1978* in 1936, *CAS* (plants tending strongly toward var. *capillaceus*), *GH* (1 plant is var. *capillaceus;* the others are var. *eradicatus;* collection with same data but numbered *1980*, *Can* (mostly var. *eradicatus* but part var. *capillaceus*).

Type collections.—(1) Var. *eradicatus*, "Hab. in stagnis vadosis ex gr. Karavuopio ex Saxajerfvi ad Karesuando Lappon. Tornensis." (2) *R. confervoides*, "*In aquosis* Lapponiae *et* Findlandiae *borealis*. v. c. ad Ulaeborg, unde specimina a A. Nylander missa dedit Angstrom." Type in the University Museum, Upsala. (3) Var. *borealis*, "R. aquatilis β eradicatus Laest. Batrachium aquatile eradicatum Fr. Mant. 3. B. confervoides Fr. in bot. notis. Herb. norm. fasc. 13. n: ro 45." (4) *F. terrestris*, "At the border of a little lake in Blaesdalen 69° 17′ Disko . . . was just flowering Aug. 1913 (Th. P.!)" *Thorbjørn Porsild*. Disko Island, Greenland.

91a **Ranunculus circinatus** Sibth var. **subrigidus** (W. Drew) L. Benson, comb. nov.

R. subrigidus W. Drew Rhodora 38: 39. *pl. 406, f. 1, 4, 10.* 1936.

Glabrous or essentially glabrous aquatic perennials: roots filiform, 0.2-0.4 mm. in diameter; stems submersed, rooting at the lowest nodes, 2-6 dm. long, or perhaps sometimes longer, mostly 1-2.5 mm. in diameter, branching, with large air chambers in the cortex; leaves usually all cauline, alternate; leaf blades all submersed and finely dissected into filiform divisions, once- or twice-trichotomous then dichotomous, the leaf as a whole globular, usually not fully collapsing when withdrawn from the water (but sometimes so), usually circinate, mostly 1-2 cm. long, 1.5-3 cm. broad, much shorter than the adjacent internodes; petioles developed only occasionally, the first leaf divisions arising

within the stipular leaf base (the leaf base dilated and the ends usually free); pedicels stout, 2-4 cm. long in flower, mostly 3-5 cm. long in fruit, markedly recurved at the bases in fruit, glabrous; sepals 5, light green, spreading, elliptic, 3-5 mm. long, half the length of the petals, deciduous before the corolla; petals 5, white or the bases yellow, 5-9 mm. long, narrowly obovate, 2-3 or 4 mm. broad, the nectary scale nearly or fully obsolete; stamens about 5-10; achenes 30-45 or 80 in a globose-ovoid head 4-6 mm. long and 4-5 mm. in diameter, each achene obovoid, 1-1.5 mm. long (usually smaller than in *R. aquatilis*), about 1 mm. dorsoventrally, 0.5 mm. laterally, roughly transversely-ridged, glabrous, hispidulous, or glabrate, the style largely deciduous, the achene beak about 0.2-0.5 mm. long; receptacle subglobose, 1 mm. long in flower, 1-1.5 mm. long in fruit, hispidulous.

Uncommon in ponds, lakes, pools, and streams at moderate elevations. Mackenzie River Delta to British Columbia and the Gaspé Peninsula, Quebec, and southward to Oregon, northeastern California, northern Nevada, Arizona, New Mexico, Kansas, Iowa, Michigan, and northwestern Massachusetts; Mexico in Sonora and Chihuahua and sparingly southward in Durango, Hidalgo, and Mexico (State). Summer.

Relationship to *R. aquatilis* var. *capillaceus* is close, and distinction is not always clear. This variety forms a connecting link between the complex of types in *R. aquatilis* and the one in *R. circinatus*. It has smaller petals and less circinate (more flaccid) leaves than the typical variety occurring in the Old World, but the distinction is not a strong one. Difficulty of separation from *R. aquatilis* var. *capillaceus* is emphasized by a collection made July 27, 1948 (pond near Ninepipes Lake, Mission Valley, Lake County, Montana, *L. Benson 13076, Pom*). Intergradation with var. *capillaceus* (*L. Benson 13075, Pom*) was evident. *R. aquatilis* var. *hispidulus* (*L. Benson 13074*) occurred in the same tiny pond.

The oldest epithet may be *R. amphibius* James, but the type seems now to have been misplaced at the herbarium of the New York Botanical Garden.

Specimens examined.—The material at the United States Herbarium has been examined while this article was in press. Only the more significant specimens from north of Mexico are cited here. BRITISH COLUMBIA: Maclennan (?) River, Fraser River, *Spreadborough* in 1898, *Geol. Surv. Can. 18226, Can.*

MACKENZIE: Mackenzie River Delta, 68° 40′ N, *A. E. Porsild 7248, Can.*

ALBERTA: St. Ann west of Edmonton, *Geol. Surv. Can. 18225, Can;* Fort Saskatchewan, *G. H. Turner 62* in 1934, *GH;* Moose (Eight) Lake, 59° 36′ N, 113° 7′ W, *Raup 2369, Can;* Cree (Mamawi) Creek, 58° 29′ N, 111° 30′ W, *Raup 2370, Can;* Jasper National Park, *Laing* in 1930, *Can;* Vermilion Lakes, *Sanson* in 1899, *Geol. Surv. Can. 22173, Can;* Bow River Valley near Banff, *S. Brown 378* in 1906, *GH, PA, 693* in 1906, *GH, PA;* Banff, *Prince* in 1900, *GH:* West of Banff, *Macoun* in 1891, *Can;* Wolf Creek, *Brinkman* in 1922, *GH;* Twin Butte, *E. H. Moss 1015, GH;* Spur Creek, Milk River Ridge, *Geol. Surv. Can. 10043, Can;* Calgary, *Macoun* in 1897, *Geol. Surv. Can. 18043, Can, Barber 221* in 1903, *GH;* West of Big Lake, *Macoun* in 1872, *Can;* Crows Nest Pass, *Macoun* in 1897, *Can;* 10 miles east of Waterton Lakes, *L. Benson 13297, Pom.*

SASKATCHEWAN: *Bourgeau* in 1858, *GH;* Indian Head, *Spreadborough* in 1892, *Can;* Crane Lake, *Macoun* in 1894, *Geol. Surv. Can. 2963, Can;* Bare Hills, *Geol. Surv. Can. 69786, Can;* Forktown, *Macoun & Herriott* in 1906, *Geol. Surv. Can. 69786, Can;* Tisdale, *Breitung* in 1940, *Can.*

MANITOBA: Sewell, *Macoun & Herriott* in 1906, *Geol. Surv. Can. 69788, Can;*

Brandon, *Macoun* in 1896, *Geol. Surv. Can. 12306, Can.* Punk Island, Lake Winnepeg, *Macoun* in 1884, *Geol. Surv. Can. 1039, Can.*

ONTARIO: Sturgeon Lake, Nipigon River, *Macoun* in 1884, *Can;* The Beacon, Mouth of Morse (?) River, *Spreadborough* in 1904, *Geol. Surv. Can. 62292, Can.*

QUEBEC: Gaspé Peninsula, The Forks and Brûlé Brook, Little Cascapedia River, *Collins, Fernald, & Pease 5007, GH, 5007A, GH;* Little Cascapedia River, *Victorin, Germain, & Jacques 33337* in 1930, *GH;* York River, *Williams, Collins, & Fernald* in 1905 (type, cf. below).

WASHINGTON: Satchap (?) River, *Wilkes Exped. 182, US;* Keechelus River. Cascade, *Went 2, UC.* YAKIMA CO. Prosser, *Colton* in 1902, *GH.* STEVENS CO. Colville River junction with Columbia River, *Boner & Weldert 176* in 1939, *RM, Utah, DS, GH;* Chewelah, *Kreager 528* in 1902, *GH.*

OREGON: JEFFERSON CO. Camp Sherman, *Peck 19802, WillU, UC;* Metiolus River, *Gorman 3889, WSC, Gale 309, DS, Mo.*

CALIFORNIA: SISKIYOU CO. Yreka, *Mooney* in 1903, *UC;* near mouth of Shasta River, *Butler 361, UC.* MODOC CO. Carmichael's Mill, Big Valley, *M. S. Baker* in 1899, *UC.* LASSEN CO. Eagle Lake, *Baker & Nutting* in 1894, *UC.* SAN FRANCISCO CO. Lake Merced, *Blankinship* in 1892, *GH.* (The California collection of *Bigelow, GH,* and of *Torrey* (*4* from Borax Lake), *GH,* are var. *capillaceus.*)

IDAHO: "9S. 37E.," *Heiderreich, ISB.* BONNER CO. Sandpoint, *Christ 545, Chr.* CANYON CO. Falk's Store, *Macbride 301* in 1910, *RM, GH.* CAMAS CO. Fairfield, *R. J. Davis 2818, ISB.* MADISON CO. Lorenzo, *Christ 8915, Chr.* BLAINE CO. Oregon Gulch, 10 miles north of Ketchum, *Cronquist 3500, GH, Utah.* CLARK CO. Sheridan Creek, *Cronquist 781,* in 1937, *Utah.* JEFFERSON CO. North of Roberts, *R. J. Davis 1057, ISB, Pom-B.*

NEVADA: *A. J. Jones, Mo.* WASHOE CO. Wadsworth, *Tidestrom 10653, US;* Truckee Valley, *W. W. Bailey* (*King Expedition*) *14* in 1867, *GH.* ORMSBY CO. *C. F. Baker* in 1902, *GH, UC, NY.* ELKO CO. Ruby Lake, *Mason 4676, UC, Pom-B.*

UTAH: BOX ELDER CO. Brigham, *Jansen & Dorgan 11* in 1938, *Utah;* Bear River Migratory Bird Refuge, *Piranian 13999* (*Maguire's No.*), *Utah, Pom-B.* DAVIS CO. Farmington Bay, *Piranian 13893* (*Maguire's No.*) in 1936, *Utah.* SALT LAKE CO. Salt Lake (presumably but not necessarily Salt Lake City), *Hayden* in 1871, *PA.* SUMMIT CO. Uintah Mountains. Bear River, *J. M. & M. T. Greenman 4716, Mo;* Goodman Ranch, Bear River, *Goodman 191* in 1927. SAN PETE CO. Ephraim, *Olson* in 1934, *Utah.* PIUTE CO. Junction, *M. E. Jones 5319* in 1894, *UC, Pom;* Kingston, *M. E. Jones 5319* in 1894, *RM, NY, Mo* (presumably the same collection). GARFIELD CO. Pine Lake, Table Cliff Plateau, *Maguire 19110* in 1940, *Utah, WSC, RM, GH, Wash;* Panguitch Lake, *Maguire 18963* in 1940, *Utah.* KANE CO. Duck Creek Lake, *Maguire 19573* in 1940, *Utah, WSC, RM;* Aspen Mirror Lake, *Maguire 19605* in 1940, *WSC, Utah.*

ARIZONA: *Palmer* in 1877, *US;* Beaver Creek, *Rusby* in 1883, *US;* East Verde River Bridge, *A. & R. Nelson 2000, Utah, RM, Mo.* COCONINO CO. Painted Desert, Tuba Oasis (Tuba City), *Clute 130, NY, GH.* GILA CO. Payson, *Collom, GH.*

MONTANA: FLATHEAD CO. Columbia Falls, *R. S. Williams* in 1894, *GH.* GLACIER NATIONAL PARK. Two Medicine Lakes, *Maguire 760* in 1932, *Utah, Pom-B, RM, GH, 761* in 1932, *Utah;* Swift Current Creek, *Maguire 758* in 1932, *Utah, 764* in 1932, *Utah, UC;* Lower St. Mary Lake, *Maguire 759* in 1932, *Utah, 763* in 1932, *Utah, Pom-B.* MISSOULA CO. Lolo Hot Springs, *F. Rose 389* in 1938, *Wash.* CLARK CO. Helena, *Kelsey* in 1892, *DS.* GALLATIN CO. Bozeman, *Blankinship 16* in 1905, *Pom.* CASCADE CO. Great Falls, *F. W. Anderson* in 1884, *UC.*

WYOMING: JOHNSON CO. Little Goose Creek, *A. Nelson 2279, RM;* Big Springs, *Buffum 24, RM.* UINTAH CO. Evanston, *A. Nelson 7195, RM, GH;* Fort Bridge, *Porter* in 1873, *PA.* ALBANY CO. Rock River, *Macbride 2749, RM;* Laramie River, *E. Nelson 3363, RM.*

COLORADO: Piedra, *C. F. Baker 321* in 1899, *Pom;* Sangre de Cristo Creek,

Rydberg & Vreeland 6255, RM; Twin Lakes, *Wolfe & Rothrock 112 & 113, GH.* LARIMER CO. Ft. Collins, *Cowen, GH.* WELD CO. Grover, *E. L. Johnston 171* in 1926, *RM.* BOULDER CO. Boulder, *Hanson C418* in 1920, *Mo.* PARK CO. Alma, *Ewan 12590, Pom.* CLEAR CREEK CO. Georgetown, *Johnson & Hedgecock 924* in 1917, *Mo.* LAKE CO. Arkansas Valley at Leadville, *L. & N. Schedin 122, RM.* PARK CO. Hartsel, *Beetle 2226, RM.* TELLER CO. Florissant, *Ramaley 1369* in 1905, *RM.* MONTROSE CO. *Payson 113* in 1913, *RM, GH.* FREMONT CO. Canyon City, *Brandegee* in 1877, *UC.* EL PASO CO. Broadmoor, *I. M. Johnston 2476, Pom;* Colorado Springs, *M. E. Jones 935* in 1879, *Pom.* ALAMOSA CO. Alamosa, *Raamley 14068* in 1932, *RM.* OURAY CO. Ouray, *Shear 4145, RM.*

NEW MEXICO: Various collections may be seen at the United States National Herbarium. SAN MIGUEL CO. Las Vegas Hot Springs, *Sturgis* in 1902, *GH.* GRANT CO. Mimbres River, Black Range, *Metcalfe 1047* in 1904, *GH, Mo* (not *Pom*).

NORTH DAKOTA: ROLETTE CO. Rolla, *Waldron 20* in 1891, *RM.* PIERCE CO. Rugby, *Bergman 2607, Mo.* BENSON CO. Leeds, *Lunell* in 1901, *RM, PA;* Devils Lake, *Geyer 2* in 1839, *Mo.* BURLEIGH CO. Bismarck, *E. Larsen 162* in 1937, *Mo.*

SOUTH DAKOTA: Hughes, *L. Adams* in 1894, *Ill.*

NEBRASKA: BUFFALO CO. Ft. Kearney, *H. Engelmann* in 1858, *Mo.*

KANSAS: RILEY CO. *Hitchcock 976, RM, NY.*

TEXAS: Pecos River, *Bigelow* in 1953-4, *US.*

MINNESOTA: OTTERTAIL CO. Fergus Falls, *P. Johnson 535* in 1941, *Wash.* LINCOLN CO. Hendricks, *J. W. Moore 13123* in 1940, *GH, Mo.* NICOLLET CO. Swan Lake, *E. P. Metcalf* in 1917, *GH.*

IOWA: CLAY CO. Freeman Township, *A. Haydon 2066, Mo.*

MICHIGAN: CHIPPEWA CO. Sault Sainte Marie, *Churchill* in 1910, *GH.*

VERMONT: Eastern Vermont, *Eggleston* in 1897, *GH;* Barnard Pond; Eastern Vermont, *Jesup & Sargent* in 1892, *GH;* Tinmouth, *Eggleston* in 1895, *GH.* WINDSOR CO. Windsor, *Eggleston* in 1897, *GH.* BENNINGTON CO. Manchester, *Day 24* in 1898, *GH.*

MASSACHUSETTS: BERKSHIRE CO. Lanesboro, *Churchill* in 1916, *GH.*

MEXICO: It is possible that the southernmost stations are range extensions due to carrying of the achenes by waterfowls as is the case with the seeds of many aquatics.

STATE UNKNOWN: *Sessé, Mociño, Castillo & Moldonado* in 1787, 1795, or 1904, *F; Schaffner 514* in 1875, *NY; Hahn* in 1868, *Mo;* Chinantla, *Liebmann 1038, US.*

SONORA: Nogales, *E. K. Smith, NY;* Horconcitos, Rio Huachinera, *White 2957, GH;* Cañon de Huépari, Rancho de Babidianchi, *White 3682, GH.*

CHIHUAHUA: Colonia Garcia, *Townsend & Barber 115, Mo, GH, Pom, F, US, HGr, NY;* Madera, *Palmer 262* in 1908, *Mo, GH, F, US, NY;* Pacheco, *Hartman 680, GH, US;* Colonia Juarez, *E. W. Nelson 6025, NY, US;* Sierra Madre, *E. W. Nelson 6025, US, NY;* Rancho Colorado, Dist. Guerrero, *Mexia 2570, Mich, UC, GH, F, CAS, NY;* Hop Valley, *M. E. Jones* in 1903, *Pom;* La Junta, *Le Sueur 1189, Tex, GH, F;* Minaca, Dist. Guerrero, *Shreve 7988, UA-Shr, F, US, GH.*

HIDALGO: Real del Monte, *Berlandier 427, Mo;* Actopan, *Schiede & Deppe, Mo.*

MEXICO: Itxlahuaca, *Gregg 719* in 1894, *Mo.*

Type collection.—"QUEBEC . . . York River. July 29, 1905, *Williams, Collins, & Fernald* (TYPE in Gray Herb.)" Type, *GH.*

92 RANUNCULUS LONGIROSTRIS Godr. Mem. Roy. Soc. Nancy 39. *f.9.* 1839

B. longirostre F. Schultz, Arch. Fl. France et All. 1: 71. 1842. *R. hydrocharis* Spenn. f. *longirostris* Hiern, Jour. Bot. Brit. & For. 9: 100. 1871. *R. aquatilis* L. var. *longirostris* Lawson, Trans. Roy. Soc. Can. 2: 45. 1884. *B. usneoides* Greene, Leafll. Bot. Obs. & Crit. 2: 106. 1910. *B. circinatum terrestre* Lunell, Amer. Midl. Nat. 4: 359. 1916.

Practically glabrous aquatic perennials; roots filiform, about 0.2 mm. in diameter; stems floating, rooting at the lower nodes, as much as 6-7 dm. long or perhaps sometimes longer, 1-3 mm. in diameter, little-branched, with air

cavities in the cortices; leaves usually all cauline, alternate, all dissected into filiform divisions, as a whole globular, reniform in outline when flattened in pressing, not collapsing when withdrawn from the water, 1-2 cm. long, 1.5-2 cm. broad, much shorter than the adjacent internodes, the divisions filiform, the leaf once- or twice-trichotomous, then dichotomous, proximally cordate and distally rounded in outline, the divisions arising within the greatly dilated stipular leaf base; pedicels appearing to be axillary (actually terminal, the stem sympodial), 1-5 cm. long, apparently not recurved in fruit, glabrous; sepals yellowish-green or purplish, spreading, narrowly elliptic, 3-4 mm. long, 1-1.5 mm. broad, half the length of the petals, early deciduous; petals 5, white, obovate, usually 4-9 mm. long, 2.5-6 mm. broad, the nectary scale reduced to a very shallow pocket or a lunate ridge along the base and sides of the gland or wholly absent, glandular area only 0.2-0.3 mm. in diameter; stamens 10-20; achenes 7-25 in a subglobose cluster or head 3-5 mm. long and 4-6 mm. in diameter, each achene obovoid, 1.3-1.7 mm. long, about 1.1 mm. dorsoventrally, 0.8 mm. laterally, roughly transversely-ridged, glabrous or hispidulous, the margin evident, the beak slender, 0.7-1.1 mm. long, straight; receptacle globose or pyriform, 1 mm. long in flower, 1-2 mm. long in fruit, densely hispid.

Aquatic in sluggish fresh water or sometimes in running streams. Southern Saskatchewan and Manitoba (rare) to the St. Lawrence River in Quebec and southwestward and southward to Idaho (rare), northeastern Nevada (rare), New Mexico, Texas, Arkansas, Alabama, and Delaware. Rare in the Western States. Summer.

This species is connected with *R. aquatilis* var. *capillaceus* through the intergrading forms comprising *R. circinatus* var. *subrigidus,* and distinction of three species in the group is somewhat arbitrary but probably justified, according to the present view of the writer. However, segregation of species in all the Subgenus *Batrachium* is tentative pending a thorough study of the numerous forms occurring in other continents.

Significant specimens.—SASKATCHEWAN: Crane Lake, southwestern Saskatchewan, *Macoun* in 1894, *GH.*

MANITOBA: Grand Trunk Railroad, *Macoun & Herriott* in 1906, *CAS, Pom, GH.*

IDAHO: Marsh Valley, *Coulter 435, PA.* ELKO CO. Mountain City, *Nelson & Macbride 2202, RM, GH;* Elko, *Kennedy 4504, PA.*

UTAH: CACHE CO. Logan Junction, *C. P. Smith 2026, Utah, RM;* Logan, *Maguire 20400* in 1940, *Utah, RM, WSC, Wash, GH, 20401* in 1934, *Utah, WSC, 20402* in 1935, *Utah.* SALT LAKE CO. Salt Lake City, *M. E. Jones* in 1880, *Utah, F. E. Leonard* in 1884, *NY, Pom, DS, Garrett 1049, NY, Clemens* in 1908, *PA;* Ft. Douglas, *Clemens* in 1908, *DS;* Jordan Valley, *S. Watson 15* in 1869, *GH, NY.* UTAH CO. Provo Canyon, *Garrett 3170, Pom-B.* PIUTE CO. Marysvale, Sevier River Valley, *Rydberg & Carleton 6930, NY, RM.*

MONTANA: Lodgepole Creek (possibly Wyoming), *Rydberg* in 1891, *NY;* North Fork Missouri (?) River *Scribner 2* in 1883, *GH.* FLATHEAD CO. Bigfork, *M. E. Jones 7991* in 1908, *Pom.* MADISON CO. Ennis, *Maynard* in 1898, *GH.* GALLATIN CO. Central Park, Bozeman, *Blankinship 16* in 1905, *PA, UC, RM.* PARK CO. Shields River north of Willsall, *Suksdorf 97* in 1916, *GH, WSC, 593, WSC, 793, WSC, 1013, WSC;* Flathead Creek, *Suksdorf 749, WSC.* LAKE CO. Ninepipes Lake, Mission Valley, *L. Benson 13090, Pom.*

COLORADO: ROUETT CO. 12 miles west of Steamboat Springs, *L. Benson 4767, Pom-B.* CLEAR CREEK CO. Clear Creek Canyon, *Coulter* in 1873, *PA.* ARAPAHOE CO. Denver, *Porter* in 1871, *PA, Wolf & Rothrock 114* in 1873, *GH* (in part), *Duthie & Clokey 3764, Clo, Pom, WSC, CAS, NY, DS, Utah, UC, RM, Wash, PA, GH.* LAKE OR PARK CO. "Elbert" Station, divide between Arkansas River and South Platte River, *Woodward* in ca. 1883, *GH.*

NEW MEXICO: COLFAX CO. Cimarron Canyon, *Castetter 1990* in 1935, *RM.* GRANT CO. Copper Mines (Santa Rita), *Thurber 23, NY, Wright 835* in 1851, *NY, GH, PA* (short-beaked); Rio Mimbres, *Thurber 216* in 1851, *GH;* Mimbres River, *Parry, Bigelow, et al., NY.*

STATE UNDETERMINED (U. S.): El Paso and Fort Yuma Wagon Road Expedition (Arkansas to Southern California via Texas, New Mexico, and Arizona, *Sutton Hayes, 7 GH*).

ALABAMA: MOBILE CO. Mobile, *C. Mohr* in 1884, *DS.* DELAWARE CO. Wilmington, *Tatnall, GH.*

Type collections.—(1) *R. longirostris*, "In aquis fluentibus Americae Borealis prope Saint Louis, Missouri." Isotype, *NY. N. Riehl*, June 1838. (2) *R. usneoides*, "Lake City, Arkansas, collected by Mr. A. H. Howell, 1 May, 1910." Type (?), *US 615523*, photograph *NY.* (3) *B. circinatum terrestre*, "A form growing on low land where water once was, but later dried up. Leeds." North Dakota, *Lunell.* In works by American authors the following names based upon Old World types have been applied in various combinations to this or *R. circinatus* var. *subrigidus: Ranunculus divaricatus* Schrank; *Ranunculus stagnalis* Wallr.; *Ranunculus rigidus* Roth.

93 RANUNCULUS PUEBLENSIS W. Drew, Rhodora 38: 46. 1936

R. trichophyllus Chaix. var. *mexicanus* Lévl. Bull. Geogr. Bot. 22: 184. 1912, not *R. mexicanus* Davis in 1900.

Subglabrous or completely glabrous aquatic perennials; roots filiform, about 0.5 mm. in diameter; stem a sympodium, floating or reclining in mud, rooting at the nodes, 2-4 or more dm. long, 1.5-2 mm. in diameter, probably branching below, with flowers opposite the upper leaves; leaf blades triternately decompound, the upper divisions dichotomous, the blades probably reniform in outline, 3-4 cm. long, 4-5 cm. broad, the divisions filiform, 0.1-0.2 mm. broad, glabrous or possibly somewhat pubescent (debris from the water?), sessile on the stipular leaf bases, the three stalk-like primary divisions 3-7 mm. long below the second trichotomies; pedicels 3-5 cm. long, glabrous; flowers not seen; achenes about 10 in a hemisperoidal or subglobose head 3-4 mm. long, and 5-6 mm. in diameter, each achene elliptic-acute, 2.3-3 mm. long, 1.5 mm. dorsoventrally, 1 mm. laterally, coarsely transversely ridged, glabrous, the margin inconspicuous, the beak slender, 1-1.1 mm. long, straight; receptacle pyriform, 1 mm. long in flower, 2 mm. long in fruit, densely hispid.

Known from a single collection in Puebla, Mexico.

Specimens examined.—PUEBLA: Puente de las Animas, *Nicolas 5948* (Arsène's number), *GH* (type of *R. pueblensis*), *US 1003337*, photograph *Pom-B, Mo 842699 Ill*, photograph *Pom-B* (isotypes of *R. pueblensis*) (all three specimens isotypes of var. *mexicanus*).

Type collections.—(1) Var. *mexicanus*, "Cette plante a été recoltée présede Puebla: Puente de las Animas, a l'altitude de 2.050 metres, le 25 novembre 1911, par la Fre. Nicolaus, sous le numéro 5948." (2) *R. pueblensis*, "MEXICO: Puente de Animas, alt. 2140 m., vicinity of Puebla, State of Puebla, *Bro. Nicolas*, no. 5948 (TYPE in Gray Herb.)."

It is hoped that further material and particularly flowering specimens will become available. The species is similar to *R. longirostris* in its fruit, but the achenes are much larger. Despite slight overlapping, the average number of achenes is smaller. The fruits are much larger than the general run of those in the North American varieties of *R. aquatilis* although those of *R. aquatilis* var. *Harrisii* from Eastern Oregon and Northern California approach them in size (2.3-2.5 mm. long) but not in the persistent beak.

Subgenus VII PALLASIANTHA L. Benson

Pallasiantha, as subgenus, L. Benson, Amer. Jour. Bot. 27: 807. 1940.

Glabrous subaquatic perennials with branching fistulous rhizomes 2-6 mm. in diameter bearing scapose or subscapose flowering branches and basal leaves. Leaf-blades simple and entire or 3-lobed or -parted. Sepals 3 or 4, yellowish-green, partly petaloid, shorter and broader than the petals, deciduous. Petals 5 or commonly 7-10, color uncertain; nectary-scale forming a large pocket. Achenes 12-25, turgid, slightly constricted above the middles; pericarp firm and close-fitting, smooth and glabrous; styles and achene-beaks well-developed. Receptacle markedly enlarged in fruit, depressed-globose.

Type species, *Ranunculus Pallasii* Schlect.

94 RANUNCULUS PALLASII Schlect. Animad. Ranunc. 1: 15 *pl.* 2. 1820

Glabrous subaquatic perennials; roots mostly adventitious from the stems, filiform, about 1 mm. or less in diameter; stems rhizomatous, perhaps several dm. long, 2-6 mm. in diameter, giving rise to flowering branches and basal leaves at each node, markedly fistulous, the walls thin; basal leaf blades simple, entire and narrowly oblong or 3-lobed and cuneate or parted into 3 oblong segments, the blades 1-4 cm. long, and 3-12 mm. broad or each segment 3-12 mm. broad, the blade proximally obtuse or acute and distally usually obtuse or rounded, the petioles 5-19 cm. long, the stipular leaf bases usually not enlarged, rarely 1.5 cm. long; cauline leaves alternate, the bracts like the foliage leaves, usually petioled; pedicels 1-13 cm. long in flower, up to 15 cm. long in fruit; sepals 3 or 4, yellowish-green, sometimes partly petaloid, spreading, elliptic, 8-10 mm. long, 4-5 mm. broad, glabrous, two-thirds the length of the petals, promptly deciduous; petals 5 or 7-10, the color uncertain, probably white, obovate to obovate-oblanceolate, 6-13 mm. long, 2.5-5 mm. broad, the nectary scale glabrous, forming a broad deep pocket, truncate; stamens 20-40; achenes 12-25 in a hemispheriod cluster about 6-8 mm. long and 8-10 mm. in diameter, each achene elliptic-oblong, about 4 mm. long, 2.5 mm. dorsoventrally, 1.5 mm. laterally, smooth, glabrous, the walls 0.5 mm. thick, the margin not conspicuous, the apical portion thickened distally beyond the slight transverse constriction, the beak slender, about 1 mm. long, recurved at the tip; receptacle depressed-globose, about 1 mm. long in flower, 2 mm. long and 4 mm. in diameter in fruit, glabrous.

Shallow water near sea level; Arctic Grassland and Tundra. Old World; Bering Sea region and northern Alaska to Baffin Island, the eastern shore of James Bay, Lat 53° 53′ N, and Port Harrison, Quebec. July and August.

Significant specimens.—BAFFIN LAND: Lake Harbor, *Polunin 1173* in 1936, *US.* ONTARIO: James Bay 20 miles scuth of Lake River, *R. H. Smith* in 1944, *US.* QUEBEC: Port Harrison, *Polunin 1598* in 1936, *Can;* Fort Georges, James Bay, 53° 53′ N, *Dutilly & Lepage 12603, Pom-B.*

Type collection.—"Habitat in littore occidentali Americae summae arcticae in sinubus scilicet Eschscholtzii et bonae spei, inque insula St. Georgii parva insula ultra insulas Aleuticas septentrionem versus sita (de Chamisso). Ubi lecta fuit planta a Pallasio derelicta nescio a Doctore Merckio fuit allata."

A hybrid of *R. Pallasii* and *R. lapponicus* has been described by Andersson and Hesselman, Bihang K. Svenska Vet.-Akad. Handlingar 26. Afd. III. (L): 42-47. 1900. There is detailed tabular comparison of the hybrid with both parents. The plant was described earlier (1883) as *R. Pallasii* var. *spetsbergenensis* Nathorst, L. Svensk Vet.-Akad. 20 (6): 21. 1883.

Subgenus VIII COPTIDIUM (Nym.) L. Benson

Coptidium, status not given, Nym. Consp. (1) 13. 1878.
Coptidium, as genus, Beurl. in Gand. Fl. Eurp. 234. 1883
Coptidium, as subsection, Prantl. in Engl. Bot. Jahrb. 9: 266. 1888.
Coptidium, as subgenus, L. Benson, Amer. Jour. Bot. 27: 807. 1940.

Glabrous terrestrial perennials with long slender rhizomes bearing basal leaves and simple scapes, each of which may have a single cauline leaf near the base. Leaf-blades very deeply 3-parted and again lobed or toothed. Sepals 3, greenish-yellow, somewhat petaloid, slightly longer and broader than the petals, deciduous. Petals 5-6, yellow, nectary-scale forming a pocket. Achenes 10-20, turgid, each constricted at the middle, the basal portion being occupied by the seed and the apical portion by spongy parenchymatous tissue; pericarp firm and close-fitting, smooth, glabrous; achene beak long and slender. Receptacle not noticeably enlarged in fruit.

Type species, *Ranunculus lapponicus* L.

95 RANUNCULUS LAPPONICUS L. Sp. Pl. 553. 1753

Coptidium lapponicum Beurl. in Gand. Fl. Eur. 234. 1883. *Anemone nudicaulis* A. Gray, Bot. Gaz. 11: 17. 1886.

Glabrous terrestrial perennials; roots slender; rhizomes several dm. long, 1.5-2 mm. in diameter, scapes decumbent, 12-25 cm. long, about 2 mm. in diameter, rather wiry, simple, not fistulous; basal leaves produced directly from the rhizome, simple, more or less reniform, 1.5-3 cm. long, 2-4 cm. broad, very deeply 3-parted, the middle part 3-5-toothed, the lateral parts again 2-lobed and toothed, the ultimate lobes rounded, the sinuses acute or obtuse, proximally cordate, distally rounded, the petioles 4-15 cm. long, half subterranean; cauline leaf 1 when present, scale-like or 3-parted, sessile; sepals 3, greenish-yellow, reflexed their whole length, ovate-lanceolate, about 7 mm. long, 3 mm. broad, glabrous, slightly longer and broader than the petals, promptly deciduous; petals 5-6, yellow, narrowly obovate, 5-6 mm. long, 1.8-2.3 mm. broad, the nectary scale glabrous, forming a pocket, truncate; stamens 5-10; achenes 10-20 in a subglobose cluster, each achene rhomboid, 4-5 mm. long, 2 mm. dorsoventrally, 1 mm. laterally, smoothh, glabrous, constricted at the

middle, the basal portion occupied by the seed, the apical by spongy parenchyma, the margin not prominent, the beak 1.5-2 mm. long, recurved; receptacle subglobose, 1-1.5 mm. long in flower, 2 mm. long in fruit, glabrous.

"In moist moss-bogs in the lowland favourably exposed to the sun during the summer" in Greenland (Porsild, Meddel. Grønl. 58: 79. 1920) or in wet forests and bogs southward; mostly at low elevations; Arctic Grassland and Tundra and Northern Forest. Europe; Asia; Alaska to Labrador and western Greenland and south to British Columbia (rare), Alberta (rare), northern Minnesota, Ontario, and Maine (Aroostook River). The writer has seen no specimens from East Greenland or Iceland. Summer.

Significant specimens.—BRITISH COLUMBIA: McLeod Lake, *Macoun* in 1875, *Can.*

ALBERTA: Chaba Lake, Headwaters of the Saskatchewan and Caribou Mountain Plateau, 58° 54′ N, 114° 9′ W, *Raup 2359, Can;* Athabasca River, *S. Brown 1178, PA;* Ft. Saskatchewan, *G. H. Turner 4576, Can;* Red Deer, *Gaetz* in 1895, *Geol. Surv. Can. 16196, Can.*

MINNESOTA: Minnesota National Forest, Between Cut-foot Sioux and Inger, *A. Johnson 3239, US, GH;* Rove Lake, *Wood* in 1891, *US;* Sand Bay, *J. C. Jones* in 1870, *GH* (type of *Anemone nudicaulis*, cf. below).

MAINE: AROOSTOOK CO. Aroostook River, *Chamberlain & Delano 649, GH.*

Type collections.—(1) *R. lapponicus*, "*Habitat in Alpibus* Lapponicis." (2) *A. nudicaulis*, "Which grows in bogs and on banks near the water at Sand Bay [Lake Superior region], Minnesota, very near lat. 48°, and in or near the Canadian Boundary . . . specimen sent to me in a letter, dated August 8, 1870, from Mr. Joseph C. Jones, then of the U. S. Steamer Search." Type, *GH.*

Subgenus IX FICARIA (Huds.) L. Benson

Ficaria, as genus, Huds. Fl. Angl. ed. 1. 313. 1762.

Ficaria, as section, A. Gray, Syn. Fl. N. Amer. 1: 20. 1895.

Ficaria, as subgenus, L. Benson, Amer. Jour. Bot. 27: 807. 1940.

Glabrous terrestrial perennials (by regeneration of stems and leaves from each of the numerous fusiform roots which become separated when the upper parts die). Stems branching and leafy on the lower parts. Leaf-blades simple and entire or slightly undulate or very shallowly dentate. Sepals 3, greenish-yellow, somewhat petaloid, smaller than the petals, deciduous. Petals 7-12 or more, yellow; the nectary scale forming a shallow pocket. Achenes 10-15 in a cluster, turgid, not constricted; the pericarp hard, thick, strong, close-fitting, smooth, glabrous or pubescent; styles lacking and the achenes beakless. Cotyledons apparently only one, the other minute and enclosed by it. Fruiting receptacle not noticeably enlarged, pyriform or globose.

Type species, *Ficaria verna* Huds.

96 RANUNCULUS FICARIA L. Sp. Pl. 550. 1753

Ficaria verna Huds. Fl. Angl. ed. 1. 214. 1762. *F. ranunculoides* Moench, Meth. 215. 1744. *F. Ficaria* Karst. Pharm. Med. Bot. 565. 1880.

Glabrous terrestrial perennials; a few roots about 1-2 mm. in diameter but most roots 5 mm. thick and forming tubers, which become annually separated when the upper parts die and which regenerate stems and leaves the following

spring; stems erect or reclining, not rooting, 1-2 dm. long, 2-3 mm. in diameter, branching, a little fistulous; basal leaf blades simple, cordate, 1-5 cm. long, 1-4.5 cm. broad, entire or obtusely angled on the margins, proximally cordate, distally obtuse, the petioles 3-15 cm. long, the stipular leaf bases 8-20 mm. long; cauline leaves alternate or opposite, like the basal, petioled; pedicels 1-7 cm. long in flower, 3-8 cm. long in fruit, glabrous; sepals 3, yellowish-green, spreading, elliptic, 5-10 mm. long, 3-4 mm. broad, glabrous, half the length of the petals, promptly deciduous; petals 7-12 (usually 7-9, sometimes increased to a greater number by modification of stamens), yellow, narrowly obovate, 8-15 mm. long, 4-8 mm. broad, the nectary scale glabrous, forming a shallow pocket, truncate; stamens 20-40; achenes 10-15 in a cluster, each achene narrowly obovoid, 2.5 mm. long, 1.8-2 mm. in diameter, smooth, the pericarp thick, hard, close-fitting, glabrous or pubescent, the margin inconspicuous, the style lacking and the achene beakless; receptacle pyriform or globose, 1 mm. long in flower, 1-2 mm. long in fruit, glabrous.

Moist land at low elevations; commonly a pasture weed; Europe; introduced in Quebec, British Columbia, along the coast in Massachusetts, on Long Island, in eastern Pennsylvania, at Washington, D. C., and in adjacent Maryland. April and May.

Specimens examined.—QUEBEC: Ville-LaSalle near Montreal, JACQUES CARTIER CO., *Victorin & Germain 46833* in 1932, *Clo, GH, PA.*

BRITISH COLUMBIA: Nanaimo, Vancouver Island, *Glendinning* in 1915, *WSC.*

MASSACHUSETTS: South Hingham, *Cushing* in 1891, *GH.*

NEW YORK: College Point, Long Island, *Schrenk* in 1876, *NY*, in 1877, *Mo, PA*, in 1878, *NY, US;* Flushing, Long Island, *Schrenk* in 1878, *NY, PA, US, Pom, E. P. Martin* in 1921, *NY;* Long Island, *W. C. Ferguson 7* in 1918, *NY;* Willow Brook, Staten Island, *Hollick* in 1891, *NY.*

PENNSYLVANIA: Fairmont Park, Philadelphia, *St. John Herbarium* in 1909, *GH;* Wissahickon Ravine, Philadelphia, *Lang 112* in 1924, *GH;* 8 miles past Wissahickon Drive, Philadelphia, *Meredith* in 1920, *NY;* Darby Creek north of Springfield, *Fogg 14021, GH, UPa.* DELAWARE CO. Lansdowne, *Elwee* in 1894, *RM, C. S. Williamson, NY, A. Painter* in 1908, *Mo, US, Meredith* in 1920, *NY.*

DISTRICT OF COLUMBIA: Washington, *Pollard* in 1896, *NY, Pom, Steele* in 1896, *GH*, in 1897, *NY.*

Type collections.—(1) *R. Ficaria*, "*Habitat in* Europae *ruderalis, umbrosis, spongiosis.*" (2) *F. verna*, based upon *R. Ficaria.* (3) *F. ranunculoides*, based upon *R. Ficaria.*

EPITHETS OF UNDETERMINED APPLICATION

RANUNCULUS ALEUTICUS Mert. Linnaea 5: 65. 1830, nom. nud. *Type collection:* "Koragin-Inseln. . . . Behrings-Strasse. . . ."

RANUNCULUS BECKII D. Don in G. Don, Gen. Syst. Gard. 1: 39. 1831. *Type collection:* Based upon R. spe. nov. Beck, Amer. Jour. Sci. 14: 116. 1828. "Native of Missouri in plains. R. nov. spe. Beck in amer jour scienc. vol. 12. April, 1828." Possibly *R. fascicularis* or its var. *apricus.*

RANUNCULUS DEBILIS Raf. Med. Repos. N. Y. II. 5: 359. 1808. *Type collection:* "Near Germantown, in Penn." Observed in 1803-1804 by C. Rafinesque-Schmaltz.

RANUNCULUS LANUGINOSUS Walt. Fl. Carol. 159. 1788. *Type collection:* Carolina.

RANUNCULUS LEPTOPETALUS Raf. Florula Ludoviciana 83. 1817. *Type collection:* Seen in Louisiana by C. C. Robin.

RANUNCULUS MEGANTHUS Raf. Florula Ludoviciana 82. 1817. *Type collection:* Seen in Louisiana by C. C. Robin.

RANUNCULUS MICRANTHUS Nutt. var. CALIFORNICUS Torr. & Gray, Fl. N. Amer. 1: 19. 1838. *Type collection:* "California, *Douglas.*"

RANUNCULUS MULTICAULIS D. Don in G. Don, Gen. Syst. Gard. 1: 34. 1831. *Type collection:* "Native of Mexico." "D. Don in herb. Lamb."

RANUNCULUS POLYPETALUS Raf. Florula Ludoviciana 83. 1817. *Type collection:* Seen in Louisiana by C. C. Robin.

RANUNCULUS ROBINII Raf. Florula Ludoviciana 82. 1817. *Type collection:* Seen in Louisiana by C. C. Robin.

ADDENDA

Ranunculus acriformis A. Gray var. **aestivalis** L. Benson, var. nov., cf. p. 43. As stated above, *loc. cit.*, the diary of Marcus E. Jones for September 3-5, 1894, indicates "Orton's Ranch" to be in the Sevier River Valley in Garfield County, southern Utah, near the Piute County line. A few current maps retain a place labelled, "Orton" west of U. S. Highway 89, but nothing was found there by the writer in August, 1948. However, by good fortune, a grandson of the Ortons was located, and he gave directions for finding the "only swamp" in the vicinity, which is sagebrush desert ordinarily incapable of supporting any *Ranunculus* except the widely distributed aquatic and palustrine species occurring along the late summer trickle of the Sevier River. The "swamp" proved to be a well-developed bog formed by seepage from many springs clogged by hummocks of *Carex* and other genera. In moist ground along the upper edge of the adjacent meadows, north of the fence which divides the moist area into two horse pastures, were 15 or 20 small clumps of *Ranunculus acriformis* var. *aestivalis*. According to his grandson, Mr. Orton kept overnight guests at his ranch house about two and one-half miles northwestward, and it is probable that Marcus Jones's collection was made at the springs, which must have been well within Orton's Ranch as it existed 54 years ago. Similar springs along probably the same fault farther up the Sevier Valley were not found to support the *Ranunculus*, and possibly Orton's Ranch is the only station at which it survives. Since the nearest relative of this variety occurs about 500 miles northeastward beyond a great deal of dry country, it is not unlikely that the plant has remained about these constant springs as a relic of a once widespread population of the Pleistocene glacial periods, when southern Utah was better-watered and numerous lakes were formed.

Type collection.—Meadow at springs just east of U. S. Highway 89 and about 300 yards west of the Sevier River, 8.3 miles by road north of the principal street intersection of Panguitch and about 1.5 miles south of the intersection with Utah State Highway 20 leading to Parowan, 6,400 feet elevation, Garfield County, Utah, *Lyman Benson 13420*, August 29, 1948. Type, *Pom 275882*, mounted on three herbarium sheets; isotypes, 15 duplicate specimens to be distributed to various institutions, including the following: *CAS, DS, GH, Mo, NY, RM, UC, US, Utah*, Brigham Young University, University of Utah, and the University of Notre Dame. A large collection was made in order to place material in several herbaria, since the variety is barely holding its own. It is hoped that future collectors, knowing the plant is represented in a number of institutions, will collect with caution, not depleting the population unduly.

RANUNCULUS GEOIDES H. B. K. var. TYPICUS. A collection received recently apparently is near or within this variety, but it is in need of further study. MEXICO: HADALGO: Top slopes, mountains near Km. 278 on highway north of Jalaca, 1500 m., *H. E. Moore, Jr. 1736*, Oct. 29, 1946, *Pom 275551*.

RANUNCULUS SP. Two collections from Albina, Portland, Oregon have not been determined satisfactorily. Since the plants were collected in the port area, where several Old World species have been introduced in ballast, it is nearly certain that they are not native. They are relatives of *Ranunculus muricatus* L., Subgenus *Euranunculus*, Section *Echinella*, and apparently near *R. trachycarpus* Fisch. & Mey. *Suksdorf 3082*, June 4, 1902, *WSC, 1341*, June 5, 1908, *WSC*.

In the summer of 1948, the Montana State University Biological Station at Yellow Bay on the east shore of Flathead Lake in northwestern Montana has been a base for plant collecting and further studies of *Ranunculus*. A few notes and cited collections in the text are based upon this summer's work (specimen numbers *12900-13500*). In addition, the writer has changed his opinion, as a result of reëxamination in the field, of the validity of combining of the East Humboldt and the Ruby Mountains in Elko County, Nevada. The gap between these two ranges is much lower than memory from previous trips indicated. In the text above, they have been lumped together as a single range. Apparently this may not be justified.

LIST OF SPECIES AND VARIETIES BY SUBGENERA AND SECTIONS

Subgenus I. EURANUNCULUS, 24, 251
Section 1. CHRYSANTHE, 9, 10, 25-109
1. *R. repens* L., 8, 29
A. Var. *typicus*, 29, 30
B. Var. *glabratus* DC., 29, 32
C. Var. *pleniflorus* Fern., 29, 33
2. *R. bulbosus* L., 34
3. *R. acris* L., 8, 35, 72
A Var. *typicus*, 36, 39
B. Var. *frigidus* Regel, 38, 39, 72
4. *R. Turneri* Greene, 38, 39
5. *R. acriformis* A. Gray, 3, 39, 40, 41
A. Var. *typicus*, 41, 42
B. Var. *montanenis* (Rydb.) L. Benson, 9, 39, 42, 43, 73
C. Var. *aestivalis* L. Benson 42, 43, 250
6. *R. occidentalis* Nutt., 3, 4, 8, 39, 40, 43, 55, 104
A. Var. *typicus*, 44, 45, 53
B. Var. *Rattanii* A. Gray, 41, 45, 47
C. Var. *Eisenii* (Kell.) A. Gray, 4, 41, 45, 47, 48, 57, 63, 65
D. Var. *ultramontanus* Greene, 45, 48, 49
E. Var. *dissectus* Henderson, 45, 50
F. Var. *Howellii* Greene, 45, 47, 51
G. Var. *brevistylis* Greene, 45, 52, 54
H. Var. *Nelsonii* (DC.) L. Benson, 39, 45, 53, 54
7. *R. hexasepalus* L. Benson, 4, 9, 39, 40, 55
8. *R. californicus* Benth., 4, 8, 39 40, 41, 55, 57, 59, 66, 104
A. Var. *typicus*, 56, 57, 58, 62
B. Var. *gratus* Jepson, 47, 57, 58
C. Var. *cuneatus* Greene, 16, 58, 60
D. Var. *rugulosus* (Greene) L. Benson, 58, 61
E. Var. *austromontanus* L. Benson, 58, 62, 67
9. *R. canus* Benth., 4, 39, 40, 41, 64
A. Var. *typicus*, 64
B. Var. *laetus* (Greene) L. Benson, 66
C. Var. *ludovicianus* (Greene) L. Benson, 57, 62, 67
10. *R. domingensis* Urb. & Ekm., 68
11. *R. uncinatus* D. Don 4, 53, 68, 70
A. Var. *typicus*, 5, 69, 72
B. Var. *parviflorus* (Torr.) L. Benson, 4, 70, 71 (R. Bongardii Greene)
C. Var. *Earlei* (Greene) L. Benson, 73
12. *R. recurvatus* Poir., 53, 55, 74
A. Var. *typicus*, 74
B. Var. *tropicus* (Griseb.) Fawc. & Rendle, 75
13. *R. pensylvanicus* L. f., 76
14. *R. Macounii* Britt., 9, 77, 80
15. *R. pacificus* (Hult.) L. Benson, 79
16. *R. septentrionalis* Poir., 32, 80, 82, 84, 87
17. *R. carolinianus* DC., 82
18. *R. hispidus* Michx., 81, 83
A. Var. *typicus*, 84, 85
B. Var. *maritandicus* (Poir.) L. Benson, 84
C. Var. *eurylobus* L. Benson, 85
D. Var. *Greenmanii* L. Benson. 86
19. *R. petiolaris* H. B. K., 87
A. Var.*typicus*, 88, 89
B. Var. *sierrae-orientalis* L. Benson, 88, 89
C. Var. *Hookeri* (Schlect.) L. Benson, 88, 89, 90
D. Var. *Mexiae* L. Benson, 88, 91
20. *R. geoides* H. B. K., 8, 91
A. Var. *typicus*, 91, 92, 251
B. Var. *oaxacensis* (Briq.) L. Benson, 92, 93
C. Var. *amellus* (Briq.) L. Benson, 92, 93
D. Var. *Standleyi* L. Benson, 92, 93
21. *R. pilosus* H. B. K., 89, 94
22. *R. orthorhynchus* Hook., 80, 95
A. Var. *typicus*, 51, 80, 96, 97, 100
B. Var. *Hallii* Jepson, 96, 97
C. Var. *alaschensis* L. Benson, 80, 97, 99
D. Var. *platyphyllus* A. Gray, 96, 97, 99, 104
E. Var. *Bloomeri* (S. Wats.) L. Benson, 97, 101
23. *R. fascicularis* Muhl., 8, 101
A. Var. *typicus*, 102
B. Var. *apricus* (Greene) Fern., 103
C. Var. *cuneiformis* (Small) L. Benson, 103
24. *R. macranthus* Scheele 9, 101, 103, 104
A. Var. *typicus*, 104, 105

B. Var. *Arsenei* L. Benson, 104, 106
25. *R. dichotomus* Moc. & Sessé, 107
26. *R. sibbaldioides* H. B. K., 108
Section 2. ECHINELLA., 109-116, 251
27. *R. hebecarpus* Hook. & Arn., 109, 110
28. *R. parviflorus* L., 109, 111
29. *R. Sardous* Crantz, 110, 112
30. *R. trilobus* Desf., 110, 113
31. *R. muricatus* L., 110, 114, 251
32. *R. arvensis* L., 110, 115
Section 3. EPIROTES., 9, 10, 12, 116-170
33. *R. nivalis* L., 9, 116, 117, 119, 121
34. *R. sulphureus* Soland., 9, 116, 121, 122
35. *R. Macauleyi* A. Gray, 9, 116, 123
A. Var. *typicus*, 123
B. Var. *Brandegeei* L. Benson 116, 124, 131, 142
36. *R. Eschscholtzii* Schlect., 117, 124, 134, 135
A. Var. *typicus*, 125, 126
B. Var. *suksdorfii* (A. Gray) L. Benson, 125, 127, 128, 131
C. Var. *eximius* (Greene) L. Benson, 125, 128, 131
D. Var. *trisectus* (Eastw.) L. Benson, 125, 126, 128, 131
E. Var. *oxynotus* (A. Gray) Jepson, 125, 126, 129
37. *R. adoneus* A. Gray, 117, 121, 129
A. Var. typicus, 130
B. Var. *alpinus* (S. Wats.) L. Benson, 124, 127, 128, 129, 131, 142
38. *R. verecundus* Rob., 117, 131, 134, 135
39. *R. gelidus* Kar. & Kir., 117, 132, 134
40. *R. pygmaeus* Wahl., 119, 134, 136, 137
A. Var. *typicus*, 134
B. Var. *Langiana* Nathorst, 135
41. *R. Sabinei* R. Br., 117, 137
42. *R. Allenii* Rob., 117, 137
43. *R. inamoenus* Greene, 116, 117, 118, 134, 137
A. Var. *typicus*, 138
B. Var. *alpeophilus* (A. Nels.) L. Benson, 134, 140, 157
C. Var. *subaffinis* (A. Gray) L. Benson, 141
44. *R. rhomboideus* Goldie, 117, 142
45. *R. Forreri* Greene, 117, 143, 173
A. Var. *typicus*, 144
B. Var. *madrensis* (Rose) L. Benson, 143, 144
46. *R. Gentryanus* L. Benson, 118, 143, 145
A. Var. *typicus*, 145
B. Var. *Palmeri* L. Benson, 146
47. *R. arizonicus* Lemmon, 118, 144, 146, 173
A. Var. *typicus*, 118, 147
B. Var. *chihuahuanus* L. Benson, 8, 120, 147
48. *R. cardiophyllus* Hook., 118, 134, 148, 150, 154, 157, 173
A. Var. *typicus*, 148
B. Var. *subsagittatus* (A. Gray) L. Benson, 149
49. *R. coloradensis* L. Benson, 118, 150, 157
50. *R. auricomus* L., 117, 118, 119, 150
A. Var. *typicus*, 151
B. Var. *glabrata* Lynge, 151, 153
51. *R. pedatifidus* J. E. Smith, 117 118, 119, 134, 151, 152, 157
52. *R. Eastwoodianus* L. Benson, 119, 155
53. *R. montigenitus* L. Benson, 119, 156
54. *R. peruvianus* Pers., 119, 143, 157
A. Var. *typicus*, 157
B. Var. *Salasii* (Standl.) L. Benson, 158
55. *R. Harveyi* (A. Gray) Britt., 119, 158
A. Var. *typicus*, 120, 159
B. Var. *australis* (Brandegee) L. Benson, 159
56. *R. allegheniensis* Britt., 120, 160
57. *R. micranthus* Nutt., 120, 161
58. *R. abortivus* L., 8, 120, 162
A. Var. *typicus*, 162, 164
B. Var. *eucyclus*, Fern., 164
C. Var. *indivisus* Fern., 165
59. *R. Donianus* Pritzel, 8, 120, 165
60. *R. Jovis* A. Nels., 8, 120, 166
61. *R. glaberrimus* Hook., 120, 167, 173
A. Var. *typicus*, 167
B. Var. *ellipticus* Greene, 168, 173
C. Var. *reconditus* (Nels. & Macbr.) L. Benson, 169
Section 4. FLAMMULA, 9, 143, 170-200
62. *R. oreogenes* Greene, 171, 172, 173
63. *R. alismaefolius* Geyer, 171, 173, 174

A. Var. *typicus*, 174, 175
B. Var. *Hartwegii* (Greene) Jepson, 174, 175, 177, 179
C. Var. *Lemmonii* (A. Gray) L. Benson, 171, 173, 174, 175, 178
D. Var. *Davisii* L. Benson, 174, 175, 179
E. Var. *alismellus* A. Gray, 174, 175, 177, 180
F. Var. *montanus* S. Wats., 174, 175, 181, 193
64. *R. oresterus* L. Benson, 2, 170, 171, 182
65. *R. ambigens* S. Wats., 171, 183, 195
66. *R. Flammula* L., 170, 171, 185, 189, 230
A. Var. *genuinus*, 184, 185, 189
B. Var. *ovalis* (Bigel.) L. Benson, 184, 186, 189
C. Var. *filiformis* (Michx.) Hook., 184, 188, 189
67. *R. hydrocharoides* A. Gray, 2, 144, 171, 189, 193
A. Var. *typicus*, 189, 190
B. Var. *stolonifer* (Hemsl.) L. Benson, 190, 191
C. Var. *natans* (Nees) L. Benson, 189, 190, 191
68. *R. Gormanii* Greene, 2, 8, 171, 192, 193
69. *R. Populago* Greene, 2, 8, 171, 193
70. *R. texensis* Engelm., 172, 194
71. *R. pusillus* Poir., 171, 172, 195, 196
A. Var. *typicus*, 197
B. Var. *angustifolius* (Engelm.) L. Benson, 197
72. *R. alveolatus* Carter, 2, 170, 172, 198
73. *R. flagelliformis* J. E. Smith. 172, 199
Section 5. HECATONIA, 200-213
74. *R. hyperboreus* Rottb., 200, 201
75. *R. natans* C. A. Mey., 191, 200, 202
A. Var. *typicus*, 202
B. Var. *intertextus* (Greene) L. Benson, 202
76. *R. sceleratus* L., 200, 203
A. Var. *typicus*, 10, 203
B. Var. *multifidus* Nutt., 204
77. *R. Gmelinii* DC., 200, 206
A. Var. *typicus*, 206, 207
B. Var. *limosus*, 207, 208
C. Var. *Hookeri*, 207, 209, 213
(*R. Purshii* Richards.)
78. *R. flabellaris* Raf., 7, 200, 211, 213
(*R. delphinifolius* Torr.)
Subgenus II. CYRTORHYNCHA, 23, 213
Section 1. HALODES, 214-218
79. *R. Cymbalaria* Pursh, 214
A. Var. *typicus*, 215
B. Var. *alpina* Hook., 216
C. Var. *saximontanus* Fern., 216, 218
Section 2. EUCYRTORHYNCHA, 214, 218-220
80. *R. ranunculinus* (Nutt.) Rydb., 218
Section 3. ARCTERANTHIS, 214, 220-221
81. *R. Cooleyae* Vasey & Rose, 220
Section 4. PSEUDAPHANOSTEMMA, 214, 221, 222
82. *R. hystriculus* A. Gray, 9, 221
Subgenus III. CERATOCEPHALUS, 10, 222
83. *R. testiculatus* Crantz, 222
Subgenus IV. OXYGRAPHIS, 223-224
84. *R. kamchaticus* DC., 223
Subgenus V. CRYMODES, 9, 10, 224-229
85. *R. glacialis* L., 9, 134, 224, 225
A. Var. *genuinus*, 225
B. Var. *Camissonis* (Schlect.) L. Benson, 226
86. *R. juniperinus* M. E. Jones, 225, 226
87. *R. Andersonii* A. Gray, 225, 227
Subgenus VI BATRACHIUM, 7, 10, 229
88. *R. hederaceus* L., 229, 230
89. *R. Lobbii* (Hiern.) A. Gray, 229, 231
90. *R. aquatilis* L., 229, 232
A. Var. *typicus*, 232, 234
B. Var. *hispidulus* E. Drew, 232, 234, 241
C. Var. *Porteri* (Britt.) L. Benson, 234, 236
D. Var. *Harrisii* L. Benson, 234, 236
E. Var. *capillaceus* (Thuill.) DC., 234, 236, 237, 241, 244
F. Var. *eradicatus* Laestad., 234, 239
91. *R. circinatus* Sibth. var. *subrigidus* (W. Drew) L. Benson, 240, 244
92. *R. longirostris* Godr., 230, 243
93. *R. pueblensis* W. Drew, 230, 245
Subgenus VII. PALLASIANTHA, 246
94. *R. Pallasii* Schlect., 246
Subgenus VIII. COPTIDIUM, 247
95. *R. lapponicus* L., 247
Subgenus IX. FICARIA, 248
96. *R. Ficaria* L., 8, 248

INDEX*

Alpine Grassland and Tundra, 12
Anemone nudicaulis, 247
Arcteranthis (Sect.) 214, **220-221**
Arcteranthis, 23, 220
Cooleyae, 220
Arctic Grassland and Tundra, 12
Atlantic Coastal Plain Relict Flora, 15
Auricomus (Subgen.), 116
Batrachium (Subgen.), 7, 10, **229**
Batrachium (Sect.), 229
Batrachium, 23, 229
aquatile caespitosum, 239
capillaceum, 237
flaccidum, 239
pantothrix, 239
var. *trichophyllum*, 237
Bakeri, 237
confervoides, 239, 240
eradicatum, 239
Grayanum, 232
hederaceum, 230
Lobbii, 231
paucistamineum var. *eradicatum*, 239
pedunculare, 237
Porteri, 236
trichophyllum, 237
var. *caespitosum*, 239
usneoides, 243
Beckwithia, 23, 224
Andersonii, 227
Austinae, 227
juniperina, 226
Boreal Flora, 11
California Chaparral, 14
California Coastal Relict Forest, 14
California Oak Woodland, 13
Ceratocephalus (Subgen.), 10, **222**
Ceratocephalus, 23, 222
spicatus, 222
Chihuahuan Desert, 16
Chrysanthe (Sect.) 9, 10, **25-109**
Chrysanthe, 25
Coastal Flora, 16
Contents, 1
Coptidium (Subgen.), **247**
Coptidium (Subsect.), 247
Coptidium, 23, 247
lapponicum, 247
Crymodes (Subgen.), 9, 10, **224-229**
Cyrtorhyncha (Subgen.), 10, **213**
Cyrtorhyncha, 23, 213
Cymbalaria, 215
neglecta, 218
ranunculina, 218
rupestris, 218
Deciduous Forests, 15
Desert Grassland, 15
Eastern and Middle Western Flora, 15
Echinella (Sect.), **109-116**, 251
Epirotes (Sect.), 9, 10, 12, **116-170**
Epirotes (Subsect.), 116
Eucyrtorhyncha (Sect.), 214, **218-220**
Euoxygraphis (Subgen.), 223
Euranunculus (Subgen.), **24**, 251
Euranunculus (Sect.), 10, 24
Ficaria (Subgen.), **248**
Ficaria (Sect.), 248
Ficaria, 23, 248
Ficaria, 248
glacialis, 223, 225
ranunculoides, 248
verna, 248
Field Studies, 3
Flammula (Sect.), 9, 143, **170-200**
Flammula, 23, 170
Genera, Concept of, 17
Geographical Distribution, 10-16
Halerpestes, 23, 214
Cymbalaria, 215
Halodes (Subgen.), 214
Halodes (Sect.), **214-218**
Hecatonia (Sect.), **200-213**
Hecatonia, 23, 200
Herbarium Studies, 5
Juniper-Pinyon Woodland, 14
Kumlienia, 23, 221
Cooleyae, 220
hystricula, 221
List of Species and Varieties by Subgenera and Sections, 252
Mexican Desert Flora, 15
Mojave Desert, 16
Natural Vegetation Areas of North America, 11-16
Northern (Coniferous) Forest, 12
Oxygraphis (Subgen.), **223-224**
Oxygraphis, 10, 23, 223
Andersonii, 227
Cymbalaria, 215
glacialis, 223, 225
vulgaris, 225
Pacific (Coniferous) Forest, 13
Pacific Grassland, 14
Pacific Northwestern Flora, 13

* Boldface type indicates new names or epithets and new combinations. Italics indicate entities or combinations not recognized, in synonymy. Boldface numerals indicate the formal descriptions or most significant coverage of the subject.

Pallasiantha (Subgen.), **246**
Plains Flora, 15
Plains Grassland, 15
Policy in Classification, 17
Prairie Flora, 15
Pseudaphanostemma (Subgen.), 221
Pseudaphanostemma (Sect.), 214, **221-222**
Ranunculus, 2-3, **23**
abortivus, 8, 120, **162**
var. *acrolasius*, 163
var. *australis*, 159
f. *coptidifolius*, 163
var. eucyclus, **164**
f. giganteus, 164
var. *grandiflorus*, 159
var. *Harveyi*, 159
var. indivisus, **165**
var. *micranthus*, 161
var. *nitidus*, 162
var. *sylvaticus*, 162
var. typicus, **162**, 164
acriformis, 3, 39, **40**, **41**
var. **aestivalis**, **42**, **43**, **250**
var. **montanensis**, 9, 39, **42**, **43**, 73
var. **typicus**, **41**, **42**
acris, 8, **35**, 72
var. frigidus, **38**, 39, 72
var. Stevenii, 37
var. typicus, **36**, 39
adoneus, 117, 121, **129**
var. alpinus, 124, 127, 128, 129, **131** ,142
var. **typicus**, **130**
affinis 152, 153, 154
var. *apetalus*, 138, 152
var. *cardiophyllus*, 148
var. *lasiocarpa*, 148
lasiococcus, 148
var. *leiocarpa*, 152
var. *micropetalus*, 138
var. *subintegrifolius*, 138
var. *validus*, 148
var. Wilanderi, 151, 155
alaskanus, 99
alceus, 49
aleuticus, 249
alismaefolius, 171, **173**, **174**
var. alismellus, 174, **175**, 177, **180**
var. *caltheflorus*, 181
var. *caule petiolisque basi hirsutis*, 177
var. **Davisii**, 174, **175**, **179**
var. Hartwegii, **174**, 175, **177**, 179
var. Lemmonii, 171, 173, **174**, 175, **178**
var. montanus, 174, **175**, **181**, 193
var. typicus, **174**, **175**
alismellus, 180
var. *Populago*, 193
allegheniensis, 120, **160**
Allenii, 117, **137**
alpeophilus, 140
alpestris, 116, 133
alveolatus, 2, 170, 172, **198**
amarillo, 94
ambigens, 171, **183**, 195
var. *obtusiusculus*, 183
amellus, 93
amphibius, 237, 241
Andersonii, 225, **227**
var. *tenellus*, 226
apetalus, 152
apricus, 103
aquatilis, 229, **232**
var. *arcticus*, 201
var. *Bakeri*, 237
var. *brachypus*, 237
var. calvescens, **234**, **239**
var. capillaceus, **234**, 236, **237**, 241, 244
var. *conferwoides*, 239, 240
var. Drouetii, 239
var. eradicatus, **234**, **239**
var. flaccidus, 239
var. **Harrisii**, **234**, **236**
f. *heterophyllus*, 232
var. hispidulus, **232**, **234**, 241
var. *Lobbii*, 231
var. *longirostris*, 243
var. *peduncularis*, 237
var. **Porteri**, **234**, **236**
var. *trichophyllus*, 237
var. typicus, **232**, **234**
arcuatus, 69
arizonicus, 118, 144, **146**, 173
var. **Chihuahuanus**, 8, 120, **147**
var. *subaffinis*, 141
var. *subsagittatus*, 149
var. **typicus**, 118, **147**
arnoglossus, 177
arvensis, 110, **115**
Aschenbornianus, 89
auricomus, 117, 118, 119, **150**
var. glabrata, **151**, 153
var. typicus, **151**
Austinae, 167
australis, 159
Beckii, 249
Belvisii, 80
Biolettii, 197
Blankinshipii, 64
Bloomeri, 101
Bolanderi, 174
Bongardii, 53, 70, 71
var. *Douglasii*, 69
var. *Earlei*, 73
Greenei, 71

var. *tenellus*, 69
Boraeanus, 38
brevicaulis, 142
bulbosus, **34**
var. *petiolulatus*, 34
caespitosus, 239
californicus, 4, 8, 39, **40**, 41, **55**, 57, 59, 66, 104
var. **austromontanus**, **58**, **62**, 67
var. *canescens*, 66
var. *canus*, 64
var. *crassifolius*, 60, 61
var. cuneatus, 16, **58**, **60**
var. gratus, 47, **57**, **58**
var. *laetus*, 66
var. *latilobus*, 56
var. *ludovicianus*, 67
var. ruguiosus, **58**, **61**
var. **typicus**, **56**, 57, **58**, 62
calthaeflorus, 181
Camissonis, 226
camtschaticus, 223
canadensis, 76
canus, 4, 39, **40**, 41, **64**
var. *Blankinshipii*, 64
var. *hesperoxys*, 66
var. laetus, **66**
var. ludovicianus, 57, 62, **67**
var. **typicus**, **64**
capillaceus, 237
cardiopetalus, 85
cardiophyllus, 118, 134, **148**, 150, 154, 157, 173
var. *coloradensis*, 150
var. *pinetorum*, 148
var. subsagittatus, **149**
var. **typicus**, **148**
caricetorum, 81
carolinianus, **82**
centellifolius, 157
chamissoi, 226
Chamissonis, 226
ciliosus, 50
circinatum terestre, 243
circinatus var. **subrigidus**, **240**, 244
Clintonii, 30
Collomae, 172
coloradensis, 118, **150**, 157
confervoides, 239
Cooleyae, **220**
cubensis, 75
cuneiformis, 103
Cusickii, 193
Cymbalaria, **214**
var. alpina, **216**
var. *americanus*, 215
f. *hebecaulis*, 215
var. major, 216
var. saximontanus, **216**, 218
var. **typicus**, **215**
cymbalistes, 161
debilis, 249
delitescens, 161
delphinifolius, 7, 105, 211
f. *submersus*, 211
f. *terrestris*, 209, 211
terrestris, 209
var. *terrestris*, 209
Deppei, 56
dichotomus, **107**
var. *genuinus*, 107
var. limnobius, 108
digitatus, 166
dissectus, 56
divaricatus, 239
var. *eradicatus*, 240
domingensis, **68**
Donianus, 8, 120, **165**
Douglasii, 69
Drouetii, 239
Drummondii, 132
Earlei, 73
Eastwoodianus, 119, **155**
echinatus, 114
Eisenii, 48
ellipticus, 168
eremogenes, 204
var. *degener*, 204
var. *longissimus*, 203
var. *pilosulus*, 204
var. *pubescens*, 204
Eschscholtzii, 117, **124**, 134, 135
var. eximius, **125**, **128**, 131
var. *Helleri*, 126
var. *Hookeri*, 126
var. oxynotus, **125**, 126, **129**
var. Suksdorfii, **125**, **127**, 128, 131
var. trisectus, **125**, 126, **128**, 131
var. **typicus**, **125**, **126**
eximius, 128
falcatus, 222
fascicularis, 8, **101**
var. apricus, **103**
var. cuneiformis, **103**
var. *Deforestii*, 102
var. **typicus**, **102**
fasciculatus, 105
Ficaria, 8, **248**
filiformis, 188
var. *ovalis*, 186
fistulosus, 209
flabellaris, 7, 200, **211**, 213
f. *riparius*, 211
flaccidus, 239

var. *confervoides*, 240
flagelliformis, 172, **199**
Flammula, 170, 171, **185**, 189, 230
alismifolius, 174
var. filiformis, **184**, **188**, 189
var. genuinus, **184**, **185**, 189
var. *intermedia*, 188
var. *laxicaulis*, 194
var. *major*, 183
var. ovalis, **184**, **186**, 189
subsp. *reptans*, 188
var. *reptans*, 188
var. samolifolius, 187
var. *strigulosus*, 186
unalaschensis, 186
var. *unalaschensis*, 186
var. *varians*, 186
Forreri, 117, **143**, 173
var. **madrensis**, 143, **144**
var. **typicus**, **144**
fluviatilis, 211
Galeottii, 89
gelidus, 117, **132**, 134
Gentryanus, 118, 143, **145**
var. **Palmeri**, **146**
var. **typicus**, **145**
geoides, 8, 91
var. **amellus**, **92**, **93**
var. **oaxacensis**, **92**, **93**
var. **Standleyi**, **92**, **93**
var. **typicus**, **91**, **92**, 251
glaberrimus, 120, **167**, 173
var. ellipticus, **168**, **173**
var. reconditus, **169**
var. **typicus**, **167**
glacialis, 9, 134, 224, **225**
var. **Camissonis**, **226**
subsp. *Chamissonis*, 226
var. genuinus, **225**
Gmelinii, 200, **206**
var. **Hookeri**, **207**, **209**, 213
var. limosus, **207**, **208**
var. *prolificus*, 209
var. *Purshii*, 209
var. schizanthus, 213
var. *terrestris*, 209
var. **typicus**, **206**, **207**
var. *yukonensis*, 206
Gormanii, 2, 8, 171, **192**, 193
Grayanus, 232
Grayi, 132
Greenei, 71
Hartwegii, 177
Harveyi, 119, **158**
var. **australis**, **159**
f. *pilosus*, 159
var. *pilosus*, 159
var. **typicus**, 120, **159**
hebecarpus, 109, **110**
var. *pusillus*, 110
hederaceus, 229, **230**
var. *Lobbii*, 231
Helleri, 126
hesperoxys, 66
hexasepalus, 4, 9, 39, **40**, **55**
hirtipes, 84
hirtus, 74
hispidus, 81, **83**
var. eurylobus, 85
var. *falsus*, 85
var. **Greenmanii**, **86**
var. **marilandicus**, **84**
var. *oreganus*, 77
var. **typicus**, **84**, 85
Holmei, 162
Hookeri, 90, 132
hornemannii, 34
Howellii, 51
humilis, 165, 197
hydrocharis f. *confervoides*, 239
Hydrocharis f. *Lobbii*, 231
hydrocharis f. *longirostris*, 243
f. *trichophyllus*, 237
hydrocharoides, 2, 144, 171, **189**, 193
var. natans, 189, **190**, **191**
var. stolonifer, **190**, **191**
var. **typicus**, 189, **190**
hyperboreus, 200, **201**
f. *fluitans*, 201
var. *natans*, 202
var. *turquetilianus*, 201
hystriculus, 9, **221**
icelandicus, 36
illinoensis, 103
inamoenus, 116, 117, 118, 134, **137**
var. alpeophilus, 134, **140**, 157
var. subaffinis, **141**
var. **typicus**, **138**
intermedius, 30, 80, 188
intertextus, 202
Jovis, 8, 120, **166**
juniperinus, 225, **226**
kamchaticus, **223**
kamtschaticus, 223
lacustris, 211
var. *terrestris*, 209
lanuginosus, 249
lapponicus, **247**
latilobus, 56
laxicaulis, 194, 195
var. *mississipiensis*, 194
Lemmonii, 178
leptopetalus, 249
limosus, 208
limoso x sceleratus, 209

Lindenianus, 105
Llaveanus, 107
Lobbii, 229, **231**
longepedunculatus, 91
longilobus, 64
longirostre, 243
longirostris, 230, **243**
lucidus, 80
Ludovicianus, 57, 67
Lyallii, 71

McCallai, 36
Macauleyi, 9, 116, **123**
  var. **Brandegeei**, 116, **124**, 131, 142
  var. **typicus**, **123**
Macounii, 9, **77**, 80
  var. *oreganus*, 77
macranthus, 9, 101, 103, **104**
  var. **Arsenei**, 104, **106**
  var. **typicus**, 104, **105**
madrensis, 144
marilandicus, 84
marmorarius, 50
maximus, 99
meganthus, 250
mexicanus, 91
michiganensis, 163
micranthus, 120, **161**
  var. californicus, 250
microlonchus, 186
micropetalus, 138
mississipiensis, 194
missouriensis, 211
montanensis, 43
montigenitus, 119, **156**
multicaulis, 250
multifidus, 211
  var. *limosus*, 208
  var. *repens*, 209
  var. *terrestris*, 209
muricatus, 110, **114**, 251
  var. *carolinianus*, 82, 114

nanus, 215
natans, 191, 200, **202**
  var. **intertextus**, **202**
  var. **typicus**, **202**
neglectus, 218
Nelsonii, 53
  glabriusculus, 69
  subsp. *insularis*, 53
  var. *tenellus*, 69
nitidus, 80, 162
nivalis, 9, 116, 117, 119, **121**
  var. *Eschscholtzii*, 126
  var. *Freilgrathii*, 121
  f. *subglobosus*, 121
  var. *sulphureus*, 122
nudatus, 147
Nuttallii, 218
oaxacensis, 93
oblongifolius, 195, 197
obtusiusculus, 183
occidentalis group, 39-41
occidentalis,
    3, 4, 8, 39, **40**, **43**,55, 104
  var. *alceus*, 49
  var. brevistylus, **45**, **52**, 54
  var. *canus*, 64
  var. dissectus, **45**, 50
  var. Eisenii,
    4, 41, **45**, 47, **48**, 57, 63, 65
  var. *hexasepalus*, 55
  var. Howellii, **45**, 47, **51**
  subsp. *insularis*, 53
  var. *laevicaulis*, 44
  var. *Lyallii*, 71
  var. *montanensis*, 43
  subsp. *Nelsonii*, 53
  var. Nelsonii, 39, **45**, **53**, 54
  var. *parviflorus*, 71
  var. Rattanii, 41, **45**, **47**
  var. *robustus*, 44, 53
  var. *tenellus*, 69
  var. *Turneri*, 38
  var. **typicus**, **44**, **45**, 53
  var. ultramontanus, **45**, 48, **49**
ocreatus, 126
octopetalus, 81
ophioglossifolius, 189
oreganus, 77
  Macounii, 77
oreogenes, 171, **172**, **173**
oresterus, 2, 170, 171, **182**
ornithorhynchus, 96
orthorhynchus, 80, **95**
  subsp. *alaschensis*, 99
  var. alaschensis, 80, **97**, **99**
  var. *alpinus*, 131
  var. **Bloomeri**, **97**, **101**
  var. Hallii, 96, **97**
  var. *maximus*, 99
  var. platyphyllus, 96, **97**, **99**, 104
  var. **typicus**, 51, 80, **96**, **97**, 100
  "form" *stenophyllus*, 96
ovalis, 142
ovatifolius, 142
oxynotus, 129
pacificus, **79**
Pallasii, **246**
  X var. spetsbergensis, 247
palmatus, 83, 84
palmifolius, 147
pantothrix, 239
parviflorus, 109, **111**
  var. *dimidiatus*, **111**

parvulus, 112
paucistamineus var. *borealis*, 239
var. *eradicatus* f. *terrestris*, 240
pedatifidus,
117, 118, 119, 134, 151, **152**, 157
var. *leiocarpus*, 152
var. *pinetorum*, 148
pensylvanicus, **76**
pentadontus, 144
peruvianus, 119, 143, **157**
var. **Salasii**, **158**
var. **typicus**, **157**
petiolaris, **87**
var. **Hookeri**, **88**, 89, **90**
var. **Mexiae**, 88, **91**
var. sierrae-orientalis, **88**, **89**
var. **typicus**, **88**, **89**
pilosus, 89, **94**
pinnatus, 107
platyphyllus, 99
politus, 99
polypetalus, 250
Populago, 2, 8, 171, **193**
Porteri, 236
Pringlei, 104, 105
pueblensis, 230, **245**
Purshii, 209
var. *dissectus*, 209
var. *geranioides*, 209
var. *Gmelinii*, 206
var. *Hookeri*, 126, 132, 209
var. *multifidus*, 211
var. polymorphus, 213
var. *prolificus*, 209
var. *radicans*, 209
var. *repens*, 209
var. shizanthus, 213
var. *terrestris*, 209
subsp. *yukonensis*, 206
pusillus, 171, 172, 195, **196**
var. angustifolius, **197**
var. denticulatus, 194
var. *Lindheimeri*, 197
var. *muticus*, 197
var. *oblongifolius*, 197
var. **typicus**, **197**
pygmaeus, 119, **134**, 136, 137
var. Langiana, **135**
var. *petiolulatus*, 135
f. *Sabinei*, 136
var. *Sabinei*, 136
var. **typicus**, **134**
ramulosus, 133
ranunculinus, **218**
Rattanii, 47
reconditus, 169
recurvatus, 53, 55, **74**
var. *adpressipilis*, 74
var. *fontinalis*, 74
f. Hargeri, 74
f. *lacvicaulis*, 74
var. *Nelsonii*, 53
var. tropicus, **75**
var. **typicus**, **74**
repens, 8, **29**
var. *erectus*, 33
var. florepleno, 34
var. glabratus, **29**, **32**
var. *hispidus*, 84
var. *hispidus* f. *Schlectendalii*, 85
var. pleniflorus, **29**, **33**
var. *strigulosus*, 186
var. *tropicus*, 75
var. typicus, **29**, **30**
reptans, 188
var. erectus, 188
var. *filiformis*, 188
var. *Gormanii*, 192
var. *intermedius*, 188
var. *ovalis*, 186, 188
var. samolifolius, 187
rhomboideus, 117, **142**
rivularis, 77
Robinii, 250
ruderalis, 162
rudis, 77
rugulosus, 61

Sabinei, 117, **136**
Salasii, 158
samolifolius, 187
saniculaeformis, 74
Sardous, 110, **112**
var. trilobus, 113
saxicola, 128
saxifragaefolius, 215
sceleratus, 200, **203**
var. *eremogenes*, 204
var. *longissimus*, 203
subsp. *multifidus*, **204**
var. multifidus, 204
var. **typicus**, 10, **203**
Schlectendalii, 85
septentrionalis, 32, **80**, 82, 84, 87
var. *caricetorum*, 81
var. *marilandicus*, 85
var. *nitidus*, 81
subsp. *pacificus*, 79
var. *pterocarpus*, 82
Sessei, 191
sibbaldioides, **108**
sicaeformis, 81
stenolobus, 131
Stevenii, 37
stolonifer, 191
subaffinis, 141
subalpinus, 105

subrigidus, 240
subsagittatus, 149
var. *subaffinis*, 141
Suksdorfii, 127
sulphureus, 9, 116, 121, **122**
tenellus, 53, 69, 70
var. *Lyallii*, 71
tener, 197
tenuipes, 44
terrestris, 192
testiculatus, **222**
texensis, 172, **194**
tomentosus, 80
Townsendii, 105
trachycarpus, 251
trachyspermus, 111, 197
var. *angustifolius*, 197
var. *Lindheimeri*, 197
trichophyllus, 237
var. *calvescens*, 239
var. *eradicatus*, 240
var. *hispidulus*, 232
var. *mexicanus*, 245
var. *typicus*, 237
tridentatus, 218
var. *major*, 216
trifoliatus, 84
trilobus, 110, **113**
trisectus, 128
triternatus, 169
tuberosus, 34
Turneri, **38**, 39
ultramontanus, 49
unalaschensis, 186
uncinatus, 4, 53, **68**, 70
var. Earlei, **73**
var. parviflorus, 4, 70, **71**
var. typicus, 5, **69**, 72
unguiculatus, 181
utahensis, 140
vagans, 191
verecundus, 117, **131**, 134, 135
verticillatus, 152
vicinalis, 152
Waldronii, 168
yukonensis, 206
Rocky Mountain (Subalpine and Montane) Forests, 12
Sagebrush Desert, 14
Sierran Madrean Flora, 13
Sierran (Subalpine and Montane) Forest, 13
Sonoran Desert, 16
Southeastern Pine Forest, 15
Southeastern Riverbottom Forest, 15
Southwestern Oak-woodland and Chaparral, 13
Species and Variety, Concept of, 17
Subtropical Flora, 16
Vegetation Areas, 11
Xanthobatrachium (Sect.), 200
Xanthobatrachium (Subsect.), 200

Book Reviews

PLANT BIOLOGY (Second Edition). By Paul Weatherwax. W. B. Saunders Co., Philadelphia, Pa. 1947. 451 pp., 190 figs., 380 plates. $4.25.

The new second edition of *Plant Biology* is the result of a need that has been apparent for a long time in our rapidly expanding college curricula. Because of the increased demand for broader programs of studies, a full year's course in botany often becomes impractical, especially, if the subject is elected because of its cultural value rather than as a background for more advanced studies. *Plant Biology* is designed for just such a purpose. The text is well adapted to a one semester course, whether as botany alone or as the botany part of a general biology course.

Though small, the text embodies most of the salient principles of science, focussing the discussion on the living plant and incorporating a happy balance between morphology, physiology and taxonomy. For a small text, *Plant Biology* embodies a surprising amount of material. This has been achieved, of course, at the expense of brevity and a condensed presentation. At the hands of a resourceful teacher it could be used as a guide to be expanded and enhanced and as a nucleus for reference reading.

The photographs and line drawings, though not all of the size that might be desired, are well chosen and accurate forming an integral part of the text. The introduction of the results of the new research on hormones, auxins, tropisms, vitamins, enzymes, viruses and antibiotics are timely and a valuable addition.

Though some teachers may feel that the taxonomic groupings are a bit too condensed, the examples chosen illustrate the major plant groups adequately. The second edition includes a new section on plant formations, covering the major plant communities of forests, grasslands, tundras and deserts, as well as, some reference to the rôle of plant breeding in agriculture. In general, there is an effort to include, in so far as it is permitted in an elementary text of this scope, a fair balance between theoretical and practical botany.

In the reviewer's estimation, the text can be recommended for a short course in botany, but does not lend itself well to the exigencies of more detailed discussions required of a text intended for a year's course, or for the student majoring in Botany. —A. L. DELISLE, University of Notre Dame, Notre Dame, Indiana.

HENRICI'S MOLDS, YEASTS AND ACTINOMYCETES (Second Edition). Revised by Skinner, Emmons and Tsuchiya. John Wiley and Sons, Inc., N. Y. 1947. xiv+409 pp., 136 figs., 5 tables. $5.00.

This revision of Henrici's text after seventeen years has returned a highly important book to the field of microbiology. The primary objective of Henrici in the first edition was to acquaint students of bacteriology with filamentous fungi together with yeasts and actinomycetes which are of interest to the medical and industrial bacteriologist. The present edition is consistent with the first in this respect. At the same time the book provides a rather thorough elementary presentation of the subject in general and could well be used in a course in microbiology designed for chemical engineers, with the omission of certain of the more specialized medical aspects. Previous specialized training in bacteriology, botany or mycology is not necessary in order to follow the text, although some knowledge of organic chemistry is essential. Unlike many texts in this field there is maintained a balance between considerations such as, on the one hand, the classification, morphology and cytology of the organisms and, on the other, their biological activities and the application of the same. Those who may be interested in more specialized

details are provided with rather extensive literature references at the end of the chapters and, in some cases, at the end of chapter sections.

Two new chapters have been added; one on variations in the lower fungi which was written by Dr. Henrici and one on antibiotic substances. The latter is unfortunately too brief to be very informative since penicillin and streptomycin are the only antibiotics discussed and the latter is relegated to a single paragraph. This revision incorporates considerable changes in classification and phylogenetic theory which are more in keeping with present day tendencies and the chapter on methods of studying the organisms has been extensively revised and brought up to date. The book has been made much more useful for the general reader by the separation of the medical and industrial aspects from the chapters in which the organisms *per se* are discussed. A valuable addition has been the increase in the amount of text devoted to the industrial microbiological activities of molds and yeasts which is more than triple that of the first edition. Medical mycology still occupies over one fourth of the text and this portion seems to suffer somewhat for lack of illustrations and for good photographic reproduction in many cases where illustrations are employed.

An important change found in this edition is the incorporation of considerable material on the mechanism of fermentations, while another valuable inclusion is found in several extensive tables listing acids, pigments and other metabolic products of fungi and including formulas and references to each. The various additions, deletions and changes which have been made since the first edition make this new edition of Henrici a necessary part of a working library of a mycologist or bacteriologist.—J. A. JUMP, University of Notre Dame, Notre Dame, Indiana.

THE CULTIVATED SPECIES OF PRIMULA. By Walter C. Blasdale. University of California Press, Berkeley and Los Angeles. 1948. xii+284 pp., 41 plates, 8 text figs., 1 map. $7.50.

The excellence of this little monograph on the cultivated primulas causes one to wish that the author, who is a professor emeritus of chemistry, might have earlier devoted his talents to things botanical. The book may be read and enjoyed by amateur and professional horticulturists alike, as it is written in an informal and lucid style. The first chapter includes a history of the genus and a brief description of the various sections of the genus which are treated at greater length in the later chapters. A chapter on biological characteristics of the genus deals with the geographical distribution of the sections together with some mention of hybridization, growth cycles and morphological peculiarities. The third chapter discusses horticultural requirements and is based largely on the experience of the author in growing primulas in the coastal region of central California. This chapter is closely related to the last chapter of the book on the cultivation of primulas in the United States—a section which could have been expanded somewhat in view of its rather inclusive title, since a reader who is not a resident of the Pacific Coast is left somewhat in doubt as to the species which he might attempt to cultivate in a particular locality. A bibliography is appended which will help somewhat in this respect.

The greatest part of the book is made up of the fifteen chapters which describe the species of horticultural significance in the various sections of the genus *Primula*, and in addition includes many species which have not taken kindly to cultivation. Additional horticultural notes are included in these chapters as well as historical observations in some instances. One of the best features of the book is the excellent group of photographs with which it is illustrated. While it is admittedly impossible to show by a single photograph the details of morphology which would be of interest to a botanist, the purpose of this volume is well served by these habit studies of most of the outstanding species of the genus. The greatest omission noted in the plates was the failure to include the most striking species native to the United States—*Primula parryi*, which is so abundant in parts of the Colorado Rockies.—J. A. JUMP, University of Notre Dame, Notre Dame, Indiana.

GENERAL PHYSIOLOGY. By Philip H. Mitchell, Ph.D. Robert P. Brown, Professor of Biology, Brown University. Fourth edition. McGraw-Hill Publications in the Zoological Sciences, A. Franklin Shull, Consulting Editor. McGraw-Hill Book Co., N. Y. 1948. 8vo., cloth, 927 pp., 201 illus. $7.50.

Advances in the knowledge of the chemical processes in living matter have been notable during the interval that has elapsed since the publication in 1938 of the third edition of this work. There have been especially important developments in the fields of bio-oxidation, the metabolism of proteins and of carbohydrates, the chemistry and functioning of vitamins and of hormones, and in studies of the patterned arrangement of molecular aggregates in protoplasm. All these are physiologically fundamental in the sense that they help us to understand the nature of vital processes.

Although the entire book has been revised, the more drastic changes in this fourth edition are in connection with excitation and contraction (Chaps. 1 and 2), the structure of living matter (Chap. 13), the permeability of cells (Chap. 15), the nutritive requirements (Chap. 25), and the subject of biological oxidation (Chap. 22). Not only has this last-named chapter been entirely rewritten, but a new chapter on intermediary metabolism has been added. The subject might seem at first thought to be a special aspect of biochemistry, but it so aptly exemplifies the interrelations in physiological functioning which characterize the behavior of the organism as a whole that it makes this subject germane to general physiology.

In this, as in previous editions, the various subdivisions of the book give consideration to such subjects, in addition to those already mentioned, as reflexes and tropisms, correlating action of the nervous system, receptors, organic constituents of living matter, biological significance of hydrogen and hydroxyl ions, the colloidal state, physicochemical structure of living matter, diffusion and osmosis, catalysis and enzymes, and the like.

Particular effort has been made in this work to emphasize that general physiology has gradually come into a new era. Research work of the experimental biologist, whether he started as a student of human physiology, of plant physiology, of comparative anatomy, or of cytology has alone given a new perspective to modern physiological science. When one considers how the development of physical chemistry has greatly reshaped former conceptions of the behavior of living matter while even the findings of the new atomic physics have already reached their application in the field of biochemistry, the time thus seems ripe to cast the phenomena of physiology in a new mold, and such is the design of this very interesting and useful book.—J. S. WADE, U. S. Department of Agriculture, Washington, D. C.